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COMPUTERWORLD

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Compaq calls, raises 386 ante

BY JULIE PITTA
CW STAFF

HOUSTON — Compaq Computer Corp. is set to match IBM's short-lived speed advantage in the personal computer market this week with its fastest 80386-based PC and a second line of 386-based systems using technology that should be more affordable to users.

Tomorrow, the company is scheduled to introduce the Deskpro 386/25, an Intel Corp. 80386-based system with a 25-MHz clock speed. In addition, it will roll out the Deskpro 386S — a lower cost version of the 386 operating at 16 MHz that will be the first system based on Intel's 386SX chip set.

Speed racers

Until recently, Compaq was considered the front-runner in 80386 technology, having been the first vendor to offer a 386-based PC in 1986. However, IBM's recent introduction of the 25-MHz Personal System/2 Model 70 put that firm ahead in the race to offer the most powerful microcomputer.

The Deskpro 386/25 will reportedly be offered in two versions: an entry-level system with a 110M-byte hard disk drive,

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Battle for supremacy

Compaq this week goes head-to-head with IBM by offering a desktop personal computer utilizing the 25-MHz Intel 80386

	[illegible]	[illegible]
Processor	Intel 80386	Intel 80386
Clock speed	25 MHz	25 MHz
Memory	1M to 16M bytes	2M to 16M bytes
Hard-disk storage	110M or 300M bytes	120M bytes
Slots	Six	Three
Base price	$10,299 to $13,299	$11,295

CW CHART

Retreat? Sun softens OSF stance

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — One month after the announcement of the Open Software Foundation, Sun Microsystems, Inc.'a alliance with AT&T appears to stand on shaky ground.

Sun is scrambling to answer a powerful challenge to its efforts to control the Unix operating system. A Sun executive last week said the firm is evaluating signing on with OSF and conceded difficulties in working with AT&T on the now controversial Unix System V, Release 4.

The addition of Sun to OSF's membership would contradict the harsh criticism the firm's executives have leveled at OSF. Recently, Sun Chairman and Chief Executive Officer Scott McNealy characterized OSF as a transparent attempt by its most prominent members, IBM and Digital Equipment Corp., to hinder Sun by creating confusion in the Unix market.

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LAN gateways slow to open

Technical questions chill user acceptance

BY PATRICIA KEEFE
CW STAFF

User resistance has emerged as the biggest stumbling block to explosive growth for gateways between PC LANs and IBM Systems Network Architecture networks, bursting ballooning sales estimates — much to the dismay of frustrated suppliers.

In fact, what was first perceived several years ago as a hot market is only now beginning to thaw, observers said recently. Demand for these gateways, which run the gamut from multisession host access cards for personal computers to local-area network-to-IBM 3174 links to SNA subsystems, will probably not catch fire for another year or so.

Frosting user interest are strategic and practical issues, including uncertainty over IBM's direction with Distributed Data Management and Systems Application Architecture, the network impact of leading-edge technology and a lack of applications addressing both desktop and host environments.

There are also users who are either too gun-shy from previous gateway disasters or are still embroiled in the early stages of LAN implementations and simply have yet to address host access. "The number of PCs linked to LANs has been to some extent overestimated," said John Carosella, a consultant at Net-

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IN DEPTH: MIS STRATEGIES

Penney cashes in on leading edge

BY ALAN ALPER
and JAMES DALY
CW STAFF

The golden rule of retailing used to be that success is determined by three factors: location, location and location.

But while it is still important where a store hangs its shingle, that is no longer the sole guarantor of success. The strategic use of information systems has become just as important.

J. C. Penney Co. is one retailer that has used information technology in merchandising, inventory control and decision support to gain a competitive edge. Without accurate and relevant customer information, a retailer is hard-pressed to either take advantage of hot-selling merchandise or minimize its "dogs."

David Evans, Penney's vice-president of systems and data processing, puts it bluntly: "We will never let ourselves be in a position where the competition can get goods on the floor with fewer people and less technology than we can."

PETER FOULDES
Penney's *David Evans*

Penney stands at the forefront in redefining retailing's rules. The 86-year-old firm, named after founder James Cash Penney Jr., spent 15 years forging an information technology infrastructure that is now the envy of rivals and helps the firm deliver on its credo: Always give the customer a fair break.

Penney realized early in the 1970s that it needed to make a substantial investment in information technology if it was to excel in the cutthroat retailing industry. That decision led to a pair of critical changes in its information gathering process:

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Cincom celebrates with new style. Cincom diversifies product line by introducing its Supra relational DBMS to the VAX, tying its SNA network manager Net/Master to AT&T's Unified Network Management Architecture and Unix and announcing CASE tools and E-mail. Page 4.

Announcement, announcement. PC Expo attendees feast on laser printer, laptop and versatile workstation victuals. Page 17.

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Quotable

"We wanted the focus to be that the boxes make the people more productive, not just 'everyone else has got a computer, so I want one, too,'"

GERRY MONDAY
J.C. PENNEY CO.

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NEWS

Modern Jazz stifled

Lotus changes tune, focuses on 1-2-3 for the Mac

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Last Tuesday was Flag Day, a celebration of our country's many freedoms. But for Lotus Development Corp.'s Modern Jazz, it was the day the music died.

Lotus announced the cancellation of the project, citing "a shift in focus to 1-2-3 for the Macintosh." Code-named 1-2-3/Mac, the product is part of a strategy of providing 1-2-3 for everyone, no matter what machine is used.

After Microsoft Corp.'s Excel ran roughshod over Lotus's Jazz in the Macintosh spreadsheet market, Lotus devised Modern Jazz, originally code-named Galaxy. As the Modern Jazz project ran into a series of delays, Microsoft continued to sew up the market with Excel.

Last month, when *Computerworld* learned of the most recent delay [CW, May 16], Lotus officials asserted that they were still committed to the product. The officials could not, however, provide a new release date.

But for Lotus, that delay, combined with a changing market, spelled the end for Modern Jazz, the product announced in March 1987 and originally scheduled to ship last summer.

"There were a significant number of bugs," admitted Frank King, senior vice-president of Lotus's Software Products Group, who added that "it was not canceled because of development reasons."

Out of tune

King said Modern Jazz no longer fit into the firm's strategy of providing one version of 1-2-3 that runs on multiple platforms.

The 1-2-3/Mac products are also meant to take advantage of Lotus's proprietary spreadsheet programming language and a communications interface that ties 1-2-3 to many data base management system products.

All members of the Modern Jazz development team have been asked to join the group working on a version of 1-2-3 for the Mac, which will add some Macintosh features to what will essentially be a personal computer-style product.

While most users had not been beating on Lotus's door to ship the product, they were interested in evaluating Modern Jazz — and in some cases switching to it if it proved worthy.

Jazz 1A will remain on the market and will continue to be supported by Lotus.

Cullinet's bottom line at low point

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Despite record revenues, Cullinet Software, Inc. — coming off a year marked by corporate shifts, financial readjustments and costly product rollouts — last week posted a $24 million loss for its 1987 fourth quarter.

The tumultuous year's closing quarter ended April 30 was Cullinet's eighth consecutive quarter in the red. The $24 million deficit — the largest quarterly loss ever for Cullinet — contributed significantly to the company's $47 million year-end loss figure.

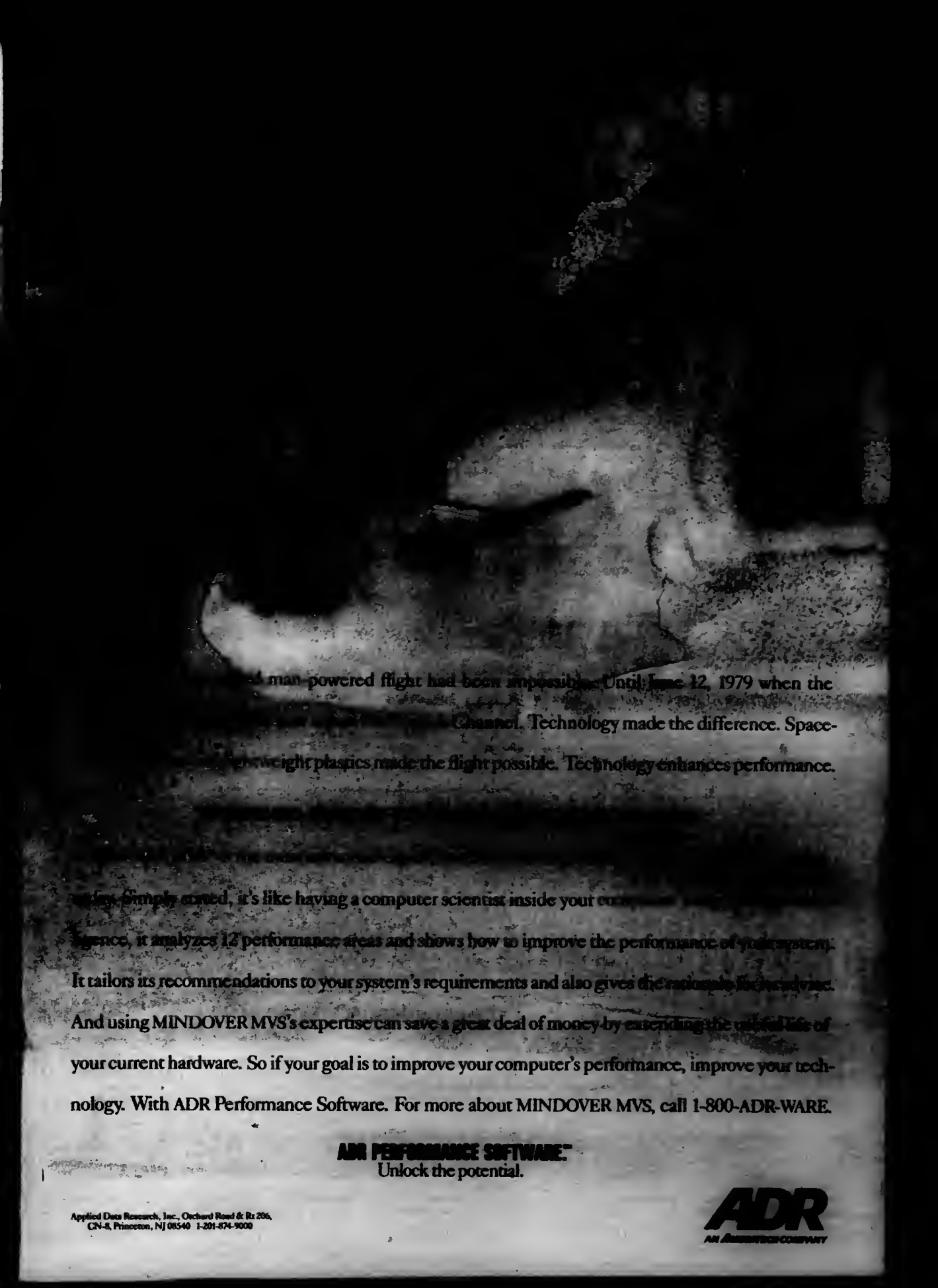
In happier news, Cullinet netted year-end revenues of $216.7 million — also a record — and a 24% jump from last year's $174.9 million revenue figure. Fourth-quarter revenue increased 5% over last year's comparable period, from $61.1 million to $64.3 million.

Expenses reflected in both the annual and fourth-quarter loss figures included not only the $14.8 million price tag for Cullinet's recent structural reorganization and new product rollout, but also the costs of marking down or writing off selected notes, accounts receivable and acquired assets.

"It was our definite intent that no extra baggage be carried into 1989," said President and Chief Operating Officer George Tamke. "We have set the stage in the best way we possibly can for 1988 to be the year in which sustained profitability can be accomplished."

"This is kind of the final scene, if you will, in our two-year effort to redefine our markets and reposition ourself as a player," said Cullinet Executive Vice-President of Marketing Jeffrey P. Papows. "No one's going to tell you that the restructuring wasn't painful — but it was necessary."

Increased penetration of the international market, now accountable for 33% of Cullinet's worldwide sales as opposed to 24% a year ago, and a healthy growth in license materials and services — up to $124 million for fiscal 1987, from $85,000 at the end of fiscal 1986 — were significant factors behind the company's strong revenue figures, Tamke said.



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High-end Windows going corporate with graphics, multitasking abilities

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. is set to release a new version of its Windows operating environment in an attempt to win more corporate users and position the product as a serious multitasking system for high-end personal computers.

Microsoft will unveil Windows 2.1 at a systems software forum it is sponsoring at the end of this month in New York, sources close to the company said last week. The software will come in two versions: one for Intel Corp. 80286-based computers and one for 80386-based machines.

Windows 2.1 provides an additional 60K bytes of random-access memory for all Windows applications. This is because the upgrade was designed to take advantage of a segment in the extended- or expanded-memory addressing region of 80286- and 80386-based PCs, sources said. The extra 60K bytes of RAM could make a significant difference for users with memory-hungry graphics applications or large data sets.

The two versions of Windows 2.1 will be called Windows/286 and Windows/386 to drive home to users their high-end orientation, according to sources familiar with the products.

New image

Although Windows 2.1 offers only limited performance enhancements, Microsoft said it hopes to change the product's less-than-celebrated image by placing a greater distance between it and the low-end Intel 8088-based machines it was first designed to run on.

Observers said Windows sales have been lackluster, in part because 8088-based computers are short on memory and run too slowly to churn out the crisp graphics images that Windows is meant to provide.

As a result, many corporate users have cast a skeptical eye on Windows and opted to wait for the upcoming OS/2 Presentation Manager from IBM, which promises sharp graphics on high-performance computers.

Microsoft, however, is not abandoning the low end. Windows/286 will also run on 8088-based PCs, although without the advantage of additional memory.

Microsoft would not comment on the enhanced product.

The package also improves on the difficult installation program of its predecessors with an improved setup plan.

There are no changes to the system's user interface, but performance increases and enhanced memory management have been added, according to sources close to the development effort.

Windows 2.1 is expected to ship in July with a price of less than $200.

County law requires VDT use program

PATCHOGUE, N.Y. — A VDT safety measure cited by supporters as ground-breaking and by opponents as antibusiness became law last week when the Suffolk County Legislature voted to override a county executive's veto.

The law, seen as the most stringent in the nation, requires businesses with 20 or more terminals to provide ergonomic furniture, lighting and terminals for workers who regularly use VDTs. The legislation, affecting the eastern portion of Long Island, N.Y., calls for employers to pick up the cost of annual employee eye examinations and related prescriptions and to provide educational programs on VDT safety.

The law does not address the pregnancy-related issues raised in recent medical research showing high miscarriage rates for VDT users.

Cincom joining VAX, Unix parades

BY CHARLES BABCOCK
CW STAFF

CINCINNATI — Cincom Systems, Inc. will move its mainframe relational data base management system, Supra, to the Digital Equipment Corp. VAX and bring out a version of its fourth-generation language, Mantis, for the IBM Personal Computer before the end of the year, members of the Cincom users group were told last week.

Cincom also announced it had reached an agreement with AT&T to integrate its IBM Systems Network Architecture (SNA) network management package, Net/Master, into AT&T's Unified Network Management Architecture. The agreement pairs Cincom, whose product is competing head-to-head with IBM's Netview, with the supplier of the network beyond an SNA gate.

Cincom will also move its product line to Unix, "the fastest growing area of computer technology," according to Thomas McLean, vice-president of marketing. However, no time frame for that step was immediately established.

Cincom is enjoying rapidly expanding revenue from its relational DBMS at a time when other mainframe DBMS vendors are backing away from competing with IBM's DB2.

Supra is expected to account for $49.2 million in revenue this year, compared with $28.9 million last year and $12.5 million the year before, Cincom officials said. A total of 432 licenses have been issued since Supra's launch in 1986.

While initially many of the licenses represented free upgrades of Total or an intermediate follow-up product, TIS, McLean said more than 75% of the licenses issued in 1987 were to new customers purchasing $300,000 to $350,000 worth of software per deal.

Open arms

Cincom customers said they welcomed the moves as diversifications that keep Cincom competitive with IBM and move it away from depending on what was once the company's mainstay, the outdated Total DBMS.

Cincom is launching its first computer-aided software engineering (CASE) tools, including Entity Transformer, which among other things can take a screen design generated by Index Technology Corp.'s Excelerator and change it into a file design for Mantis.

The company also plans to move into office automation and information resource management with such products as electronic mail and an active data dictionary.

Cincom customers also made it known that they believe the Cincinnati-based software organization has moved slowly on bringing SQL to its relational data base products. They said they are impatient for Release 1.3 of Supra, which is currently in controlled release, to achieve general availability status.

One new product touted by Cincom in a 20th anniversary celebration set of announcements meant that some Cincom customers would finally get what they wanted — a chance to use Mantis with DB2.

"We're really sold on Mantis," said Rus McMann, a software developer with the U.S. Information Agency in Washington, D.C. Cincom announced an SQL interface between Mantis and DB2 at the outset of its 20th anniversary conference. "As a result," McMann said, "our division chief said we're going to buy DB2."

Cincom officials acknowledged that there was a risk in producing the interface but said they did not want to stop a tradition of making Mantis programs useful with other vendors' data base systems.

Supra for the VAX is likely to overshadow Ultra, the product Cincom already markets to DEC customers. A spokesman at a beta-test site for the product said Supra was able to process transactions at a 40% faster rate than Ultra.

A potential user, Marlin Brusberg, data base administrator at Rockwell International Corp. in Golden, Colo., said Supra will bring mainframe functionality to the VAX. For example, he said his copy of Ultra lacks good utilities for moving a developed set of files used in a test to a production system. Supra, on the other hand, handles the task easily.

Privately held Cincom, with a controlling share of the company owned by Chairman Thomas Nies, is coming out of a transition that saw the company shift its revenue stream from established products to five new product lines in the last four years.

Out with the old

Cincom has turned over its product line in the last five years; new products now account for almost 80% of the company's revenue

Gross revenue	$91,500	$95,400	$95,600	$132,500	$163,100
New product revenues[1]	$25,000	$28,400	$48,300	$86,900	$129,600
Percent of total	27.4%	29.8%	50.6%	65.6%	79.5%

[1] Includes Supra, Ultra, Mantis, Net/Master and Control Manufacturing
[2] Estimated

INFORMATION PROVIDED BY CINCOM SYSTEMS, INC.
CW CHART

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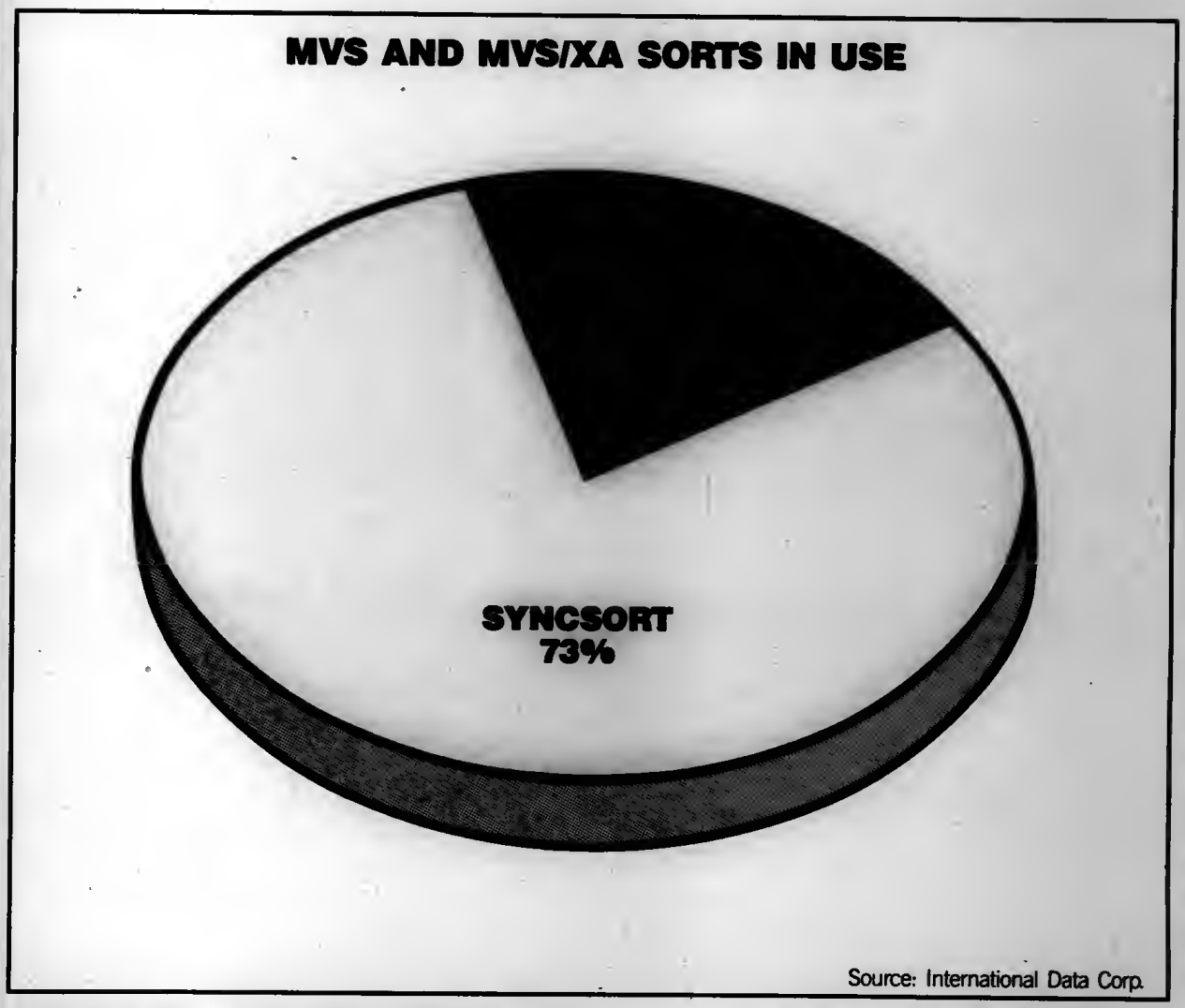

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Compaq

FROM PAGE 1

priced at $10,299, and a higher end model with a 300M-byte hard drive, priced at $13,299. Both will offer six expansion slots.

In contrast, IBM's Model 70 costs $11,295 with a 120M-byte hard drive and three expansion slots. Like most members of the PS/2 line, it sports the Micro Channel architecture, which IBM said offers improved speed and coprocessor support. Compaq's systems feature its Flex Architecture, based on the IBM Personal Computer AT bus.

In addition to meeting IBM with the Deskpro 386/25, Compaq said it hopes to build an image as a low-cost 80386 provider with the Deskpro 386S. Based on the 386SX chip set, which was commonly known before its introduction last week as the P9, the 386S can run software designed for 32-bit machines — but at slower rates, because it uses a 16-bit data path.

Although the price for the 386SX chip set is expected to be comparable to that of a standard 386 set, design costs are lower. Industry analysts predicted that the new chip set will eventually allow 80386-based systems to be priced comparably to the less powerful Intel 80286 microprocessors. Forecasts said systems based on this technology could cost less than $2,500.

Compaq's *25-MHz 386/25*

Compaq will offer three versions of the Deskpro 386S, ranging in price from $3,799 for an entry-level version to $5,199 for a high-end model. A mid-range 386S will cost $4,499. Michael Swavely, Compaq's marketing vice-president, said he expects the 386S system to lure current 80286-based micro users who desire more power but are reluctant to migrate to 80386 technology because of price.

"We are . . . moving the 386 more into the mainstream, making it affordable for those who would otherwise buy a 286 machine," he said.

Swavely said he believes 80386-based microcomputers will compose more than 50% of the market by the end of 1990.

Price cut

Compaq also dropped the price on its best-selling Deskpro 286 Model 40, a 12-MHz, 80286-based system with a 40M-byte hard disk drive, to $4,199 from the original $4,499. That product is still the most expensive in Compaq's 286-based line. The price for IBM's comparable PS/2 Model 50 Z, a 10-MHz, 286-based system introduced three weeks ago, ranges from $3,995 to $4,595.

Despite the low price of products like the 386S, market research firm Dataquest, Inc. said the market for 80286-based PCs will remain strong through 1992. "There will be enough of a price difference between 286s and any 386 that the 286 will remain attractive to a lot of people," Dataquest analyst Bill Lempesis said.

However, Lempesis said he expects products based on the 386SX chip set to become staples in most product lines, with debuts of these systems gaining momentum.

Current Compaq users appear pleased with the new offerings. Lee Youngblood, workstation program manager at Alexander & Alexander Services, Inc., an insurance brokerage in Towson, Md., said he hopes to use the Deskpro 386/25 as a server in a local-area network. He envisioned the Deskpro 386S systems as workstations — faster than the current 80286-based PCs he uses on the network.

"Both would allow us to speed up OS/2," Youngblood said. "It sounds promising if we can do it at a good cost."

Senior Editor Douglas Barney contributed to this report.

Best of both worlds?

Compaq uses Intel's 80386SX to offer 32-bit processing on a 16-bit bus system at a relatively low price

Compaq Deskpro 386S

Processor: Intel 80386SX
Clock speed: 16 MHz
Memory: 1M to 13M bytes
Storage:
5¼-in. 1.2M-byte disk,
20M-byte fixed disk (Model 20) and
40M-byte fixed disk (Model 40)
Base price: $3,799, $4,499 and $5,119, respectively

Sample options:
Intel 80387SX coprocessor — $790
1M-byte memory board — $699
1M-byte memory module — $649
4M-byte memory board — $2,699
4M-byte memory module — $2,599
MS-DOS 3.3 and Basic — $120
OS/2 Version 1.0 — $325
Monitor — $355 to $999

CW CHART

NAS beats IBM to fiber-optic mainframe

BY J. A. SAVAGE
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems (NAS) said last week it will offer fiber-optic channels on its mainframes next year, leapfrogging a feature that many anticipated to be included by IBM in its next mainframe upgrade.

Fiber-optic channels will permit data to be flashed at the speed of light between processors and storage devices located as much as 2 km away while using only 3% of the space taken by current channels, the company said. The firm also announced a remote control monitoring facility for a "lights-out," or automated, computer room and three partitionable models of its AS/XL series mainframe.

NAS is the first U.S. company to offer the option of fiber-optic channels, which are expected to be available at the beginning of next year on its AS/XL and AS/VL mainframes. But NAS's hardware supplier, Hitachi Ltd., has had fiber-optic channels available in Japan since January.

The NAS channels will move data at 3M and 6M byte/sec., the firm said. Channel lengths can be measured at 1 km when connecting mainframes to NAS's high-performance disk drives and IBM-compatible peripherals and at 2 km when connecting the mainframe to NAS's solid-state storage device, printers or magnetic tape. Current technology is limited to about 400 ft, a major restriction in crowded data centers.

"It may seem pedestrian, but a real concern of a lot of users as application demands increase and the need for equipment increases is, Where do you put it?" said Jeffry Beeler, an analyst at San Jose, Calif.-based Dataquest, Inc. "This creates an opportunity for users to move DASD out to other locations. It's even possible to move high-frequency [frequently used] data to another floor with no performance drop."

A new posture

The NAS announcement continues the move by plug-compatible manufacturers (PCM) into an active rather than reactive posture relative to IBM and signaled what may be the end of the IBM leads, PCMs follow tradition.

Last month, the other U.S.-based IBM PCM, Amdahl Corp., jumped ahead of IBM's announcement of the F series by unveiling its own 100-plus million instructions per second (MIPS) machine.

Fiber-optic channels may facilitate a backup computer center without slow data transfer rates, according to Carl Claunch, director of market planning at NAS, so users do not have to endure slow speeds for operation security. Claunch estimated that 10% of NAS customers will use fiber-optic channels, which will be priced at $272,000 per four-channel group. Up to 48 channels on NAS's AS/XL Model 100 can be optical channels, and four channels on all AS/VL models can be optical.

The longer distance capability of the new channels is attractive, said Scott Abbey, MIS managing director at Morgan Stanley Group, Inc. Despite moving to a more spacious data center in New York, Abbey said he may still consider fiber optics to connect peripherals long-distance.

"There may be some benefit in [using the channels] in a complex of buildings so you can pump data underground to them instead of over phone lines," said Mike Heschel, vice-president of information resources at Baxter Healthcare Corp. in Chicago.

The lights-out feature is a hardware and software package designed to automate data centers. One AS Control Facility will control one NAS mainframe via telephone wire to any personal computer or standard terminal.

An NAS spokesman said the remote control monitoring facility will be available for beta testing in September and will cost between $20,000 and $25,000, excluding the PC.

The partitioning function will be most useful in facilitating migration to IBM's Enterprise Systems Architecture. During migration, one-third or one-half of the CPU can run an application while programmers work on converting the system.

The partitioning models — the AS/XL Model 50, AS/XL Model 60 and AS/XL Model 70, with roughly 33, 46 and 61 MIPS, respectively — will be available the last quarter of 1989, NAS said. The computers will be partitioned two or three ways. The Model 50 will be priced at $6.8 million, the Model 60 will cost $8.8 million, and the Model 70 will cost $9.6 million, according to NAS. Although the machines will be partitionable, users will have to pay only one license fee, NAS said.

386SX taps older bus

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Intel Corp. last week unveiled the anticipated hybrid microprocessor — popularly termed the "P9" in recent press reports — that will reportedly run software developed for its 80386 chip while using lower cost components designed for the 80286 architecture.

Like the 386, the 80386SX is a 32-bit microprocessor, but it uses a 16-bit external data bus, as does the 286. The 16-bit bus is more cost-effective because of its reduced component count and board-space requirements, according to Claude Leglise, marketing manager at Intel's Microcomputer Division.

The 16-MHz 386SX is expected to bring 386 costs down in line with 286 systems, analysts said. The chip is said to further propel the 386 architecture as the standard computing platform while partially eroding the 286 and 8086 markets. However, software designed for the 386 will still have to contend with the 386SX's 16-bit data-path bottleneck. As a result, 386SX-based micros will be attractive to end users more interested in price/performance than in the fastest speeds.

Compaq Computer Corp. last week was the first to embrace the chip (see story above). Intel said about 50 micro vendors are committed to the 386SX chip, but it would not elaborate. It has been widely speculated that IBM also plans to introduce a 386SX-based Personal System/2 model later this year. Neither IBM nor Intel would comment.

"There is a new generation of software development targeted at the 386," said Bruce Schechter, Intel's 386SX product manager. "But users in the 286 class don't have access to such software as Windows 386 and Unix System V/386, and MIS managers have been concerned that if they buy a mid-range PC, it could be outmoded by new software."

The 386SX has already begun high-volume production shipments at Intel's Livermore, Calif., manufacturing plant, according to Schechter. The company would not release production-level information.

Hacker accesses DOD network

Classified data untouched, but security questioned as culprit uses own name for password

BY KATHY CHIN LEONG
CW STAFF

PASADENA, CALIF. - The National Aeronautics and Space Administration Jet Propulsion Laboratory (JPL) confirmed last week that the FBI is investigating a security breach of the Department of Defense's computer network. The JPL said a hacker gained access into the network last month.

According to JPL spokesman Jim Doyle, the incident, which occurred on the evening of May 16, did not affect any of the data on Arpanet, a national network used by scientists, federal agencies and universities. There was nothing classified on the network, he added.

The hacker did not tap information on any of JPL's internal data bases but was able to browse through an active microelectronics training application.

Doyle said the culprit entered JPL's Digital Equipment Corp. minicomputer by entering his own name as the password. That name was the same password used by a JPL employee.

"Employees are cautioned not to use their names for security reasons," he said. "It didn't take a genius to get into this."

After logging on as a JPL employee, the hacker also gained access to a computer at the Patuxent River, Md., Naval Air Station.

Technical details regarding the model of the computer and the exact method by which JPL detected the intruder were not available at press time.

There were no suspects as of last week, Doyle said. "Everything is in the FBI's hands now."

The incident also occurred at least one time last year when the Chaos Computer Club in Hamburg, West Germany, admitted to breaking into the system.

In the meantime, JPL will be tightening the security features of the system and changing the computers' operating system in case a virus was left behind.

Doyle said the laboratory was compelled to hold a press conference after local reporters learned of the incident.

> "IT DIDN'T take a genius to get into this."
>
> JIM DOYLE
> NASA JET PROPULSION LABORATORY

Ashton-Tate replaces users' defective disks

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. is replacing an undisclosed number of defective Dbase III Plus and Multimate Advantage II packages that have been frustrating users trying to install the programs.

The packages contain an incorrect error message that reads "insufficient memory" whenever a user attempts to load the program onto a personal computer. The misleading message is caused by incorrect serial number assignments made to the programs during manufacturing.

Ashton-Tate first realized there was a problem with the packages about four weeks ago, when the number of complaints about defective disks rose dramatically, according to Richard DiGiovanni, the firm's vice-president of support services.

Instead of the average 10 calls per week, Ashton-Tate said it was receiving about 40 complaints about Multimate and 30 about Dbase. The high rate of calls has continued.

The problem was traced back to a single disk-duplicating machine last week after that device was found to have been churning out potentially defective disks for three straight weeks. DiGiovanni said the error message was placed randomly on the disks and that he could not determine the number of disks that were affected.

No problem

Ashton-Tate would not disclose the cost of the disk replacement effort and downplayed its impact.

"I don't think it's going to take a significant amount of money to run the program," DiGiovanni said.

Users with packages that were produced in certain serial number ranges can receive a replacement free of charge by contacting Ashton-Tate's service department.

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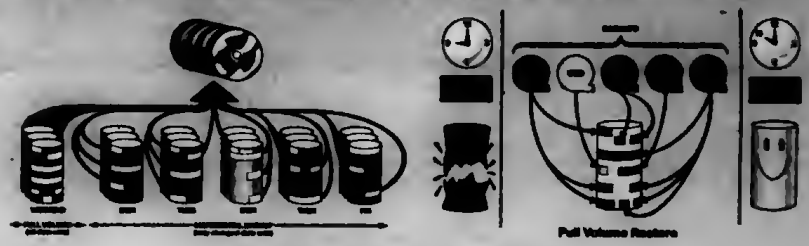

Available for IBM, OS, VS1, MVS and MVS/XA

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Silverlake not an easy solution?

BY STANLEY GIBSON
and CHARLES BABCOCK
CW STAFF

IBM is scheduled to announce its Silverlake processors tomorrow, and customers who want an SAA-compliant system are likely to be disappointed at the software compromises that brought them to market.

Although it is likely to be touted as IBM's first Systems Application Architecture (SAA) machine, Silverlake is not expected to feature all SAA languages. Rather, IBM is likely to add RPG, the language most popular with the System/36 and 38 programming communities, to SAA in order to make Silverlake both acceptable to its customer base and minimally compliant with IBM's standards for software portability.

In another compromise, the data base management system will reportedly remain embedded in the operating system, much as it is in the System/38's Control Program Facility (CPF), but RPG will be given the ability to use some SQL calls. The initial Silverlake SQL version is unlikely to be fully compatible with the SQL used with IBM's DB2 relational mainframe system, key software sources indicated. "It will not support all the data types available for DB2. It's still the old [System/38] DBMS underneath," one source said.

"I keep thinking the thing is a bigger, better System/38," said W. W. D. Dowdell, director of research at McCormack & Dodge Corp. in Natick, Mass., which offers System/36 and 38 products.

At the same time, Silverlake is emerging as a machine with the potential to rival IBM's low-end 3090s and eventually grow into its own mainframe line. That growth path would give mid-range customers a seemingly open, upward migration path for the first time.

Inside info

IBM began briefing consultants and analysts on the new machines last week in Rochester, Minn., where Silverlake was developed. Conversations with these analysts and other parties privy to the series yielded the following description:

- The processors will sport a new operating system, called AS/400, that will look very similar to the System/38's CPF. It will share the same 48-bit address word — which is used in no other IBM operating system — and will offer similar system management, security and command language.
- RPG II and III, the favorite programming languages of the System/36 and 38 communities, will both run on Silverlake, with a third version of the language expected to be offered for inclusion under SAA, the IBM collection of software slated to operate at three hardware levels.

Silverlake will need RPG II source code to run System/36 applications, but the programs will apparently have to be recompiled for execution on the new machines. It will run RPG III programs as they are. The new version of RPG, rather than being a dramatic advance, is expected to represent a machine-independent version of RPG II with an SQL interface added to meet SAA requirements for portability.

- The main alternative to RPG expected to surface with the announcement is Cobol 85. The System/38 already runs many Cobol applications at larger user sites, and IBM will accomplish its goal of SAA portability by making Cobol 85 available early on the Silverlake, several sources indicated.

The portable C programming language is not expected to be available on Silverlake on introduction, although it remains a prime candidate for addition at a later date. IBM reportedly saw little need, given its other tasks, to try to add C at the outset when System/36 and 38 users express little interest in the languages; likewise for Fortran. But two non-SAA languages, Pascal and PL/I, are expected to be available.

Option plays

Despite its compromises and initial limitations, Silverlake will offer a number of long-range options. The System/38 was designed to isolate its operating system from hardware dependencies. It can be jiggered to emulate another processor more easily than any other processor. At the same time, its 48-bit addressing gives it mainframe-size virtual memory capabilities that have yet to be fully exploited in current incarnations, the sources said.

"One of the points here is that IBM is trying to create demand in the mid-range," said Frederic Withington, an independent consultant in New York.

Withington said the consolidation of product lines is an urgent strategic need for IBM in order to reduce the overhead costs associated with maintaining several incompatible and sometimes overlapping product lines.

Sneak peek at system specs

Initially, the IBM Silverlake line is expected to be composed of six processors. Two will resemble the IBM System/36 5363s introduced in October 1987 and four will wear 9380 designations, positioning them above the low end of IBM's 370 line, the 9370s.

A variety of sources, several of them briefed last week by IBM, offered the following specifications:

- The largest Silverlake machines will have 96M bytes of main memory, or three times the amount of the largest current System/38 processor, and will be capable of addressing up to 27.6G bytes of direct-access storage device memory. The largest Silverlake would thus be roughly comparable in memory capacity to an IBM 3090 Model 300E.
- The machines are expected to operate with a number of currently available System/36, 38 and 9370 peripherals.
- IBM is claiming the processor will be capable of 2,000 to 40,000 transactions per hour, based on the company's Ramp C benchmark. The sources indicated that the high-end model will perform at 1.7 times the power of a System/38 Model 700.
- Pricing is expected to range from $20,000 for a low-end system to $700,000 for a fully configured high-end system.
- The high-end processor will be capable of 6 to 7 million instructions per second (MIPS), a level that would overlap all but the most powerful model of the IBM 4381 systems.

Dale Kutnick, an independent consultant in Redding, Conn., estimated that IBM will ship 10,000 Silverlake units this year and 20,000 units in 1989. By 1991, the processor should be boosted to 12 MIPS, he predicted.

STANLEY GIBSON
and CHARLES BABCOCK

RPG comes to PS/2

BY ROSEMARY HAMILTON
CW STAFF

IBM is planning to release late this year a version of its mid-range RPG programming language for its Personal System/2 platform, sources said last week.

California Software Products, Inc. in Santa Ana, Calif., is developing an RPG II compiler that will allow IBM System/36 programs to run on PS/2s. IBM will market the California Software product, which had been tentatively scheduled for introduction this week but may be rescheduled for introduction this fall, sources said.

An IBM spokesman said he would not speculate on future products.

A California Software spokesman said he could not comment on the company's relationship with IBM but said it is planning to market a version of its Baby/36 product for Microsoft Corp.'s MS OS/2. Baby/36 provides System/36 emulation on the personal computer platform.

The California Software product will be available for any microcomputer running the OS/2 operating system, according to the company. The IBM product is reportedly for use with the PS/2 only.

The IBM product will be another step in its Systems Application Architecture strategy of providing a computing environment in which tools and applications can be moved from one hardware platform to another.

It will also provide a multiuser environment on the PS/2 platform as well as open up a new market to System/36 developers.

One System/36 developer, who requested anonymity, said his firm is testing an early version of the compiler.

He said response time was slow and that "they'll have to work out the problem with speed for the terminals attached to it.

"But," he added, "it really works. It's a true multiuser capability on OS/2."

CORRECTION

The In Depth article "Rating the vendors: Whose DBMS runs the fastest?" [CW, May 9] by William Inmon was accompanied by two bar charts, on pages 82 and 83, that were misleading.

Specifically, the combination of transactions per second and data base requests per second on the same charts yielded an incorrect picture of data base management systems' relative performance.

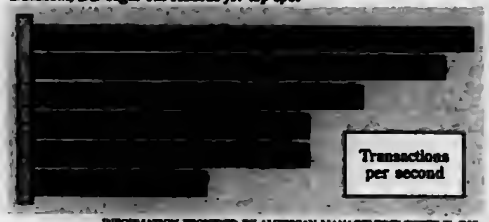
The charts at right represent the information in its correct form.

Before publication of the article, *Computerworld*'s editors and the author of the story concurred that combining the two performance measures would be acceptable.

After publication, the misleading nature of the charts became evident.

As the text of the article pointed out, the most accurate graphical comparison between DBMSs can be made by comparing just the transactions per second.

Performance: CICS-based DBMS
Datacom/DB edges out Adabas for top spot



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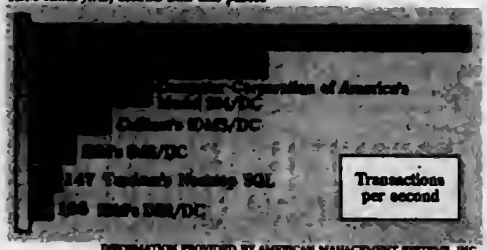
CW CHART

Performance: Non-CICS DBMS
IBM takes first, second and last places



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COMPUTERWORLD

Oracle invades Ashton-Tate PC heartland

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Oracle Corp. swaggered into Ashton-Tate Corp.'a key market last week, announcing a Dbase clone that also includes an SQL engine and at the same time sparking a war of words between the longtime antagonists.

For years Oracle has yearned for Ashton-Tate'a huge base of personal computer users, and Ashton-Tate has longed for Oracle'a lucrative host-oriented markets. Rather than wait for a clash in the middle, Oracle is again taking the fight to the heart of Ashton-Tate'a PC base, a battle it has lost before. "We want to make Oracle accessible to millions of PC users," said Gene Shklar, director of marketing for Oracle'a PC product line.

The two products, Oracle DBXL and Oracle Quicksilver, were developed by Wordtech Systems, Inc., the same firm that sold Ashton-Tate the SQL used in Dbase IV and provided the key members that form Ashton-Tate'a SQL development squad. Oracle will add its data base management system engine to the Wordtech products, Oracle licenses the products and owns exclusive marketing rights.

To its arsenal of DBMS products, Oracle claimed it will add full Dbase language support and a compiler that can run against Oracle data bases. Like Dbase IV, the products are expected this fall. Pricing was not disclosed, although it is expected to be similar to the current price of Wordtech'a existing products — Quicksilver at $599 and DBXL at $199.

The products should also help plug weaknesses in Oracle'a PC DBMS line, which has suffered from carrying the baggage of a minicomputer heritage. If successful, the Oracle products will do everything Dbase does and will add access to a hefty line of distributed DBMS packages.

Meanwhile, Ashton-Tate is arming itself with Dbase IV, which includes SQL language support but retains the Dbase engine, and SQL Server, a multiuser relational engine from Sybase, Inc. that works with Dbase IV.

While these concepts sound simple, they raise a confusing question: Who has the best PC DBMS strategy? That question was just the opening needed for both vendors to start blasting.

Oracle'a Shklar called into question Ashton-Tate'a entire approach to SQL, particularly the attempt to translate SQL queries into Dbase and run the queries against a non-SQL Dbase engine, technology Ashton-Tate acquired from Wordtech. "It is like turning gold into lead," Shklar remarked.

Ashton-Tate scoffed at Oracle'a attempt to plunder its Dbase market. In fact, Roy Folk, executive vice-president and general manager of Ashton-Tate'a Software Products Division, argued that the products will provide a way for Oracle users to migrate to Dbase — just the opposite of what Oracle has in mind.

A persistent problem for Oracle has been the perception that its DBMS is difficult for PC users to operate. Oracle recently tackled that problem with a Lotus Development Corp. 1-2-3 interface that shields users from Oracle'a inherent complexity.

"You can have it both ways," said Earl Mott, manager of Advanced Manufacturing and Engineering Systems at Haworth, Inc., referring to the 1-2-3 interface. "They have a facility that helps create the SQL statement via menus. But if you know SQL, you can use it."

While most Dbase users seem content with stand-alone systems and have scant interest in SQL, others are itching to break with Dbase tradition. "I would like to move our Dbase users to Oracle. Then we could move them from PCs to a VAX as their needs grow," Mott said.

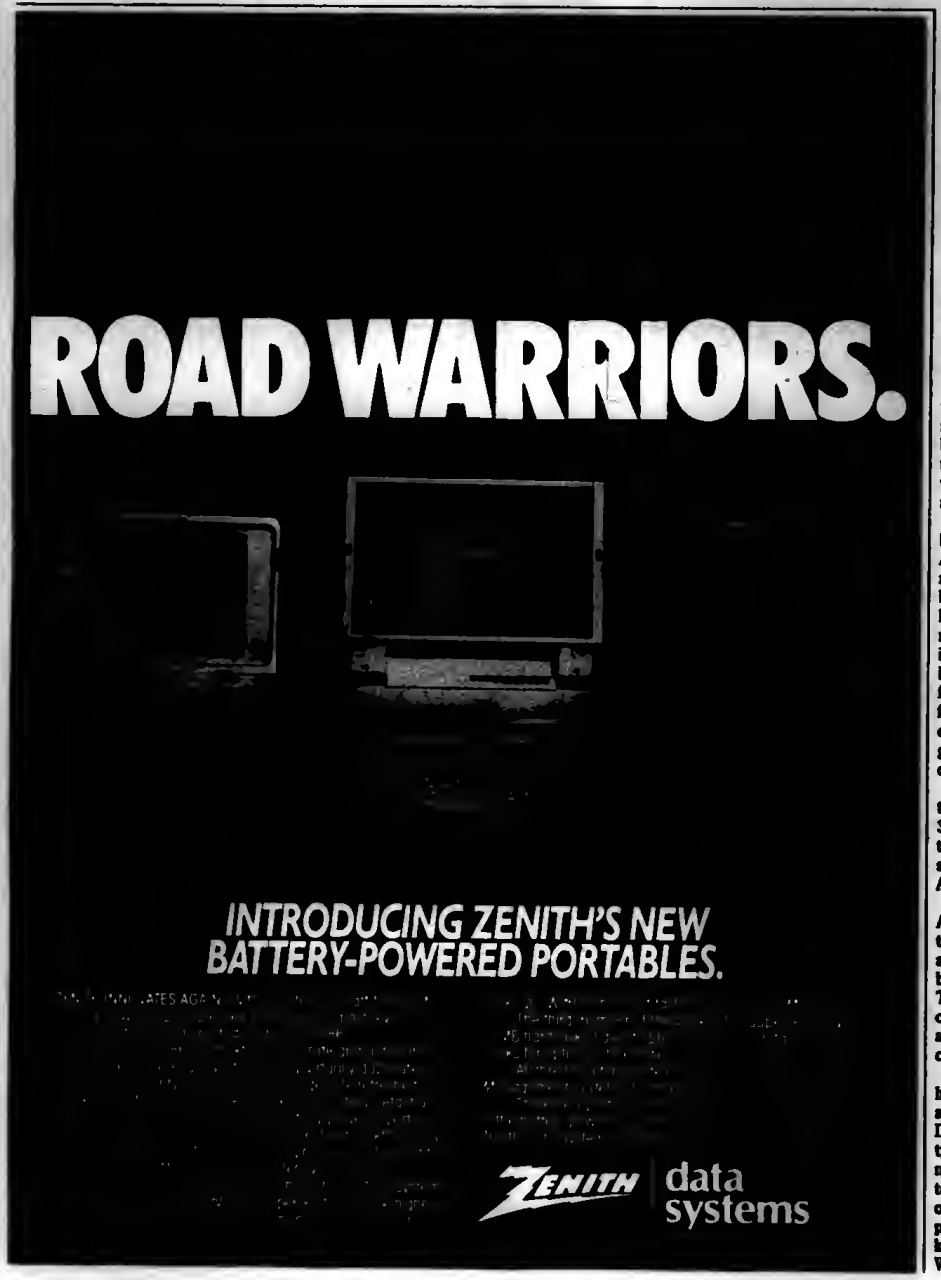
Room for everyone

Another user sees room for both companies. Howard Fosdick, relational database project leader at Amoco Corp., said he believes Dbase may continue to dominate single-user and local-area network installations. However, he added, it will lose accounts where accessing mainframes is a hot issue. Many users will opt for products such as IBM'a OS/2 Extended Edition, which will offer a relational engine and a broad range of communications capabilities, according to Fosdick.

Ashton-Tate'a stock got trounced after the Oracle news hit the street, falling 3¾ points from its Monday level of 27¼ to a Thursday low of 23½. Some analysts said that Oracle, nearly twice the size of Ashton-Tate, is tough competition.

"This is probably very bad news for Ashton-Tate. They are offering a relatively tight connection between Dbase IV and SQL server, but users have a choice between that and Oracle," said Jeffrey Tarter, publisher of "Soft-Letter." "Oracle with Dbase is a lot more open. There are more hardware and operating system choices."

In an ironic twist to the story, Oracle has apparently insulated itself from legal action by Ashton-Tate over selling a Dbase clone. Wordtech received immunity from such a suit as part of the agreement covering its sale of SQL technology to Ashton-Tate. The indemnity "carries over. There are restrictions on selling our product [to another vendor], but not marketing," claimed Bart Van Voorhis, Wordtech executive vice-president.



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Retreat?

CONTINUED FROM PAGE 1

Bill Woo, director of strategic marketing for Sun, conceded that Sun's partnership with AT&T has been less than harmonious as Sun pressures AT&T to accelerate its schedule for Release 4.

"The two companies have vastly different corporate cultures," Woo said. "With that kind of situation, there's always a tendency toward some rough spots, but we're working through them."

Hustling

Woo said that Sun is attempting to speed up schedules for Release 4. He added, however, that AT&T "owns" the schedule. Release 4 is currently scheduled to ship in mid-1989. "It's our goal to get this product out as soon as possible," he explained. "We'd like to ship it next week if we could. There is a sense of urgency now."

Complicating the relationship is a change in management at AT&T's Data Systems Group. Robert Kavner recently replaced Vittorio Cassoni as president of this group. Woo said the change caused some expected ripples but that Kavner is committed to the joint Unix development effort.

AT&T has denied any difficulties in its relationship with Sun. A spokesman said that AT&T has no interest in joining OSF and that there have been no discussions between AT&T and any of OSF's members. He declined to comment on Sun's attempt to commence discussions with the group.

Kavner said aspects of OSF's Unix alternative will be incorporated into Release 4 if they are deemed worthy.

OSF, which includes IBM, DEC, Hewlett-Packard Co. and Apollo Computer, Inc., may eventually cause a rift between Sun and AT&T, industry observers said. Woo admitted that Sun requested a membership application from OSF, but be stopped short of saying that Sun will join the group.

"We're evaluating it," be said. "We need to ask a lot of questions before we make any decisions. But certainly, we'd like to open discussions with OSF."

Among those questions are: What will be the porting base for OSF's version of Unix, and how will it incorporate existing Unix technology?

Questions like these may be less important than Sun's need to ally itself with a winner in the Unix fray. Industry observers said that Sun's relationship with AT&T — while it affords Sun the most influence over Unix development — may eventually harm Sun.

"The last thing Sun would want to do is find itself isolated with AT&T against everyone else," said Maury Domengeaux, a Unix analyst at Framingham, Mass.-based International Data Corp. "They need to join for competitive reasons."

Last fall, AT&T said it would join forces with Sun to develop the latest version of Unix. AT&T became one of the first licensees of Sun's Scalable Processor Architecture (Sparc).

Up in arms

The duality of the relationship stirred the Unix community to rebellion. Despite assurances to the contrary from AT&T, members of what would later become OSF complained that Sun would receive an unfair advantage because of its relationship with AT&T. They feared that Unix would be optimized for Sparc and that Sun, as part of the development effort, could bring products more quickly to market than its competitors.

Part of the reason for Sun's disenchantment with AT&T may stem from frustration. "On one hand, you have Sun — this dynamic, fast-growing, yuppie company — and on the other hand, you have AT&T — the ultimate in bureaucracy outside of the federal government," said Brad Smith, Unix industry analyst at Dataquest, Inc. "AT&T is their biggest liability."

Woo conceded that both Sun and AT&T were, in part, responsible for inciting the rebellion. "Everybody has to accept some degree of blame," he maintained. "Sun may have been to blame in that we were aggressive in our hype about Sparc and driving the Unix standard. We were not being sensitive to normal marketing conduct, and we generated an undue, harsh response."

Sun emulates IBM terminals

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. last week introduced a software product allowing Sun workstations to emulate an IBM 3179G graphics display terminal when connected to an IBM mainframe.

Among the features offered on the Sunlink CG3270 is display support for host color graphics, dynamic scaling of displayed images and multiple terminal sessions. Other capabilities include laser printer image compatibility and local display manipulation.

The price for Sunlink CG3270 is $950 per terminal session. It is scheduled for availability in the third quarter.

Brian Craig, product marketing manager for Sunlink CG3270, said the product is "more of a checkoff" in Sun's strategy to offer desktop systems with multiple uses.

"We want to offer users a single desktop system that allows them to use it for everything, regardless of whether the application is performed locally or elsewhere at the mainframe level," Craig explained.

Craig said the product is an enhancement to Sun's line of products that are compatible with IBM's Systems Application Architecture. It uses Sun's News Release 1.1.

JULIE PITTA

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Arthur Young squabble heats up

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Whose practice is it, anyway?

When a sizable chunk of Arthur Young & Co.'s Midwest software consulting practice broke away from the New York-based certified public accounting (CPA) firm late last month, Arthur Young filed a suit against the five partners who left and took 27 employees with them. Last week, the controversy over the partners' right to set up shop here as Technology Solutions Co. heated up as the breakaway group filed a $15 million countersuit.

The countersuit, filed in New York State Supreme Court, alleges that Arthur Young tried to prevent venture capitalists from bankrolling Technology Solutions into a national software firm that would offer custom and off-the-shelf applications for manufacturing, insurance and consumer applications.

It also charges that Arthur Young tried to convince a major corporate client not to move its account from Arthur Young to Technology Solutions. Of the $15 million claimed, $14 million would be for damages; $1 million would be for capital and compensation withheld from the former partners.

Breach of contract?

For its part, Arthur Young said it believes the two partners it fired — Albert Beedie Jr., now president of Technology Solutions, and Joyce Bennis — are breaching their partnership agreement.

"We have no objection to their starting a new business," said Arthur Young Vice-Chairman John Schornack, who is also the Midwest regional managing partner. "But they all signed a covenant not to take our clients or to take our people." That covenant, he said, prevents former partners from soliciting Arthur Young's clients for two years.

Undaunted by the suit, Technology Solutions is unpacking furniture in a new 3,500-sq-ft space on North Michigan Ave. The desks are uncluttered, partly because the partners' business papers and files have been impounded at Arthur Young.

Still, Beedie and others said they are using their telephones to line up new business and new clients.

"We haven't broken the law at all," Beedie said. "And I don't think their litigation will affect our ability to build our business at all."

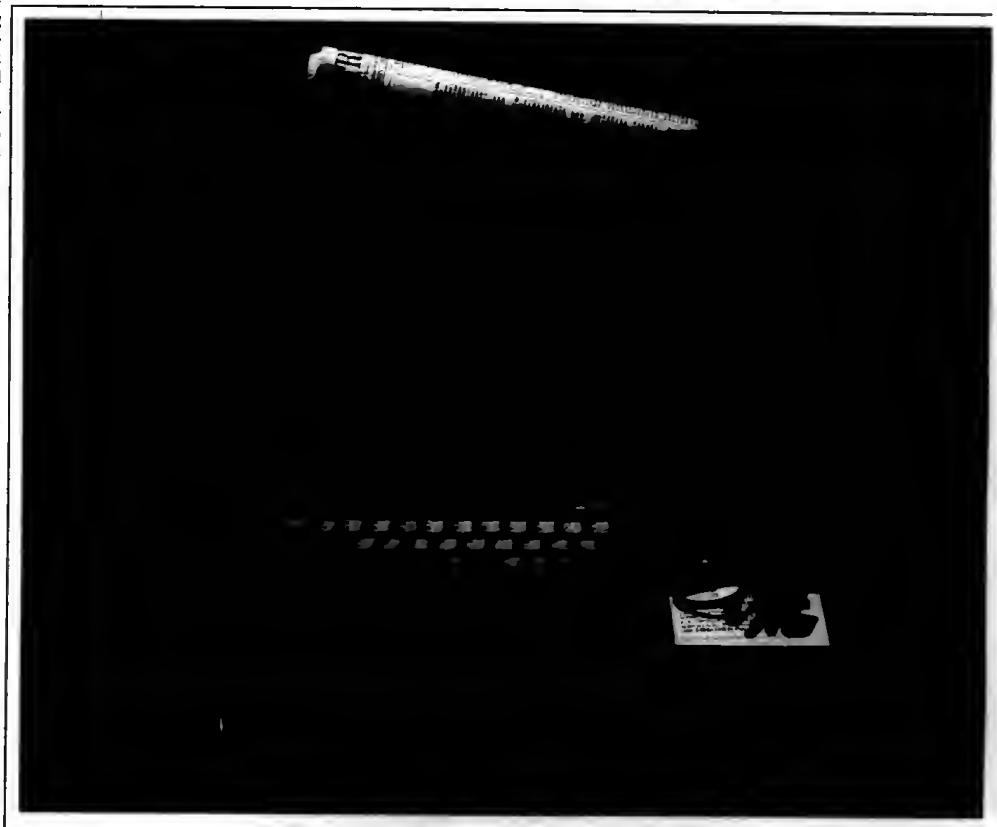
Technology Solutions plans to have 100 people on board by fall and 300 to 400 on staff by 1991.

But the legal dispute lingers on, casting shadows on the fledgling software firm. On June 9, Technology Solutions offered to buy the Midwest Management Consulting Group for $50 million — an offer Schornack labeled "absurd and preposterous."

That strategy proved offensive to Arthur Young's upper management, which plans to retain its Midwest consulting practice. "We feel they're taking something that doesn't belong to them," Schornack said.

But Technology Solutions painted a different picture of what happened. After Beedie and Bennis were fired May 25, another three Midwest consulting partners resigned, and 27 more decided to leave Arthur Young to join the new venture. Technology Solutions claimed that none of its employees were asked to leave Arthur Young. Instead, they reportedly took the initiative to call Beedie and others, asking to come along.

"It's a single, cohesive group that left Arthur Young," maintained Michael Meyers, now vice-president of consumer product systems at Technology Solutions. Meyers said the Midwest consultants were forced to confront the CPA firm's management over the issue of independence. "We were a systems culture trying to act within the context of an accounting culture."



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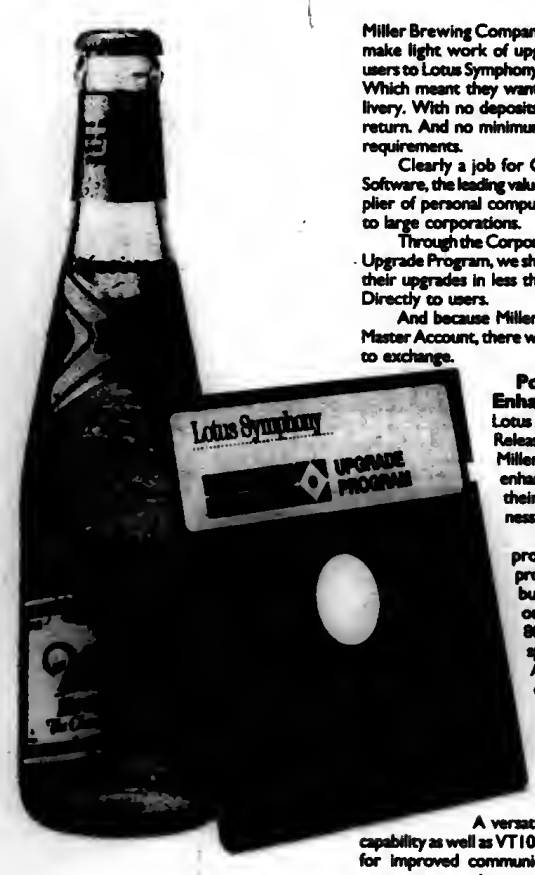

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Natural carried out to operating systems

BY NELL MARGOLIS
CW STAFF

RESTON, Va. — Taking a step toward the computer center automation it plans to kick off this fall, Software AG of North America, Inc. today unveiled a software package that gives users fourth-generation language access to IBM mainframe operating system data.

The tool, called Natural Process, is an extension of Software AG's Natural fourth-generation application development language. It will enable users to access, process, update and manipulate operating system information from within other Natural applications, according to product manager of Natural technology, Jon Ebert.

While such data is culled from a variety of sources, he said, it is presented to the user as if it were present in a data base file.

"Natural Process looks like Adabas [Software AG's data base] to Natural," said Bill O'Cain, systems programmer at South Carolina's Department of Health & Environmental Control, a Natural Process beta-test site in Columbia.

Instead of engaging in multistep, multifile procedures that mandate familiarity with multiple languages, often including the unwieldy job control language with which systems programmers and operators often work, "the end user doesn't even have to use a utility — just Natural," O'Cain said.

In addition to giving Natural users entry into the operating system, Ebert said, Natural Process will let developers build direct operating system interfaces into applications.

Such an application, for instance, is under way at beta-test site Gold Bond Building Products in Charlotte, N.C., where Natural Process is enabling users to keep tabs on the status of jobs sent to the printer — and to do it on-line. Before Software AG stepped in, the number of job status requests phoned in to the Gold Bond DP help desk were up to 30 per day.

Business first

The Software AG product is particularly welcome at Gold Bond, said senior data base analyst Dan Burger, in view of the company's preference for hiring business mavens rather than technology experts as programmers. "It's easier to teach programming to people who can understand our business than the other way around," Burger said. However, he added, that philosophy used to hit a wall when it came to getting MBAs to invest large amounts of time in complex programmer utilities.

Natural Process, Burger said, scaled the wall. "For example, all I have to do is write a simple program in Natural, built right into our application processing application, and a user can determine if the data base is running and know not to start a backup procedure — which used to require a utility."

At South Carolina's department of health, O'Cain and crew are using Natural Process to capture JCL listings and program output and archive it to Adabas, from which it can be easily retrieved and reviewed on-line. Before Natural Process, O'Cain said, JCL output — which contains patient records and financial information that the agency is required to save for up to seven years — was printed out; storing it consumed valuable space, and rewriting lost reports consumed valuable systems analyst time.

Opening opportunities

In its first release, according to Roel Pieper, Software AG's vice-president of product technology, Natural Process makes about 50 IBM mainframe operating system functions available, with more slated to follow in subsequent implementations.

Embedded in Natural, Natural Process works with a host of other Software AG offerings, including a data transfer facility that lets microcomputers and mainframes share data, a facility that turns out reports in graphical form, a report generator that also maintains end-user data files and a networking software product that gives the user call access on remotely located data.

Available immediately for IBM's MVS and MVS/XA operating systems with any teleprocessing system supported by Natural—including Complete from Software AG as well as IBM's CICS, IMS/DC, TSO and VM/CMS — Natural Process prices for users of Adabas and Natural range from $19,200 to $24,000. A stand-alone version slated for fourth-quarter delivery will be priced from $38,000 to $48,000.

PC Expo rollout door open

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — When the PC Expo show opens here tomorrow, users will not be greeted by blockbuster new products. But if they are interested in laser printers, laptops and versatile workstations, the show might just whet their appetites.

- Altos Computer Systems, Inc. is set to introduce an IBM Personal Computer AT compatible that comes bundled with an Ethernet-based Unix server connectivity board. The system, dubbed the WS 100, uses the Altos Application Executive (Apex), a windowing, icon-based interface that integrates Unix and Microsoft Corp. MS-DOS applications. Users will actually combine Apex with Microsoft Windows to run DOS and Unix applications at the same time. The system will start at $1,795.
- For laser printer aficionados, BDT Products, Inc. will reportedly unveil its Ergoprint 610, a laser printer station aimed at departmental use. To handle the needs of multiple users, the printer comes with 10 output trays and seven input trays. The system is said to produce up to 25,000 envelopes and sheets each month. Pricing has not yet been announced.
- Datacopy Corp. should trumpet a new version of its PC Image, image-processing software that can reproduce gray-scaled images, providing more sharpness than other approaches. The firm is also expected to announce that its entire family of scanner and facsimile boards have been redesigned to work with the IBM Personal System/2.
- To keep data safe and secure, Fifth Generation Systems, Inc. is expected to show off Counterpart, an automatic backup product that includes an add-in board and software. With Counterpart, users add an extra hard disk drive, which continually mirrors what is stored on the primary drive. No price has been announced for the system.
- Instead of an extra hard disk drive, Emerald Systems Corp. said it will pitch its new 5¼-in. half-height cartridge tape drives. The systems run on local-area networks, as well as on Xenix and MS-DOS systems, and come in 60- or 150M-byte versions. The 60M-byte version sells for $1,295, while the 150M-byte version goes for $2,095.
- Graphics card maker Genoa Systems Corp. is scheduled to announce a $199 Superspectrum card that emulates Hercules Computer Technology, Inc.'s Hercules Graphics and IBM's Monochrome Display Adapter and Color Graphics Adapter.

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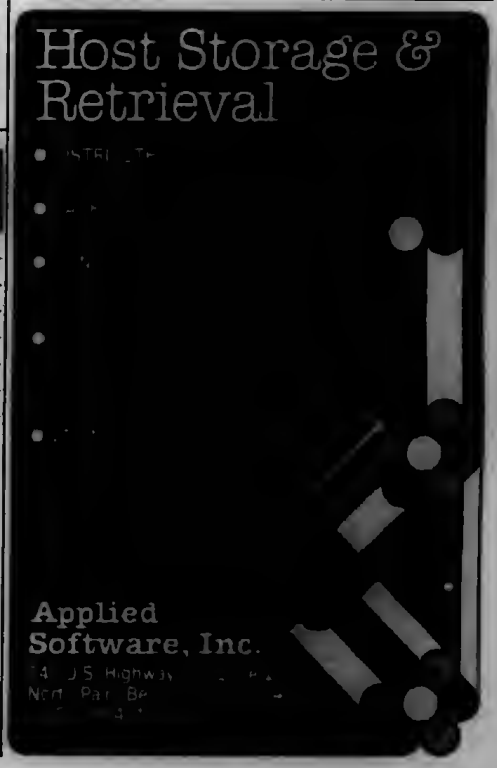


EDITORIAL

Morals over $$$

For as long as anyone at *Computerworld* can remember, IBM's annual meeting has been punctuated by a proxy item calling for an end to its doing business in South Africa.

The same call went out at scores of other computer companies during the past decade. In fact, a large number of firms have stopped doing business in that overtly racist and oppressive country, although the largest firms by and large continue with business pretty much as usual.

Even presidential candidate George Bush has nailed a small, anti-South Africa plank onto his platform, labeling the country's policies as "racist."

But as a CW article pointed out last week, there can be a wide gulf between intent and execution of even the most altruistic of ambitions. In particular, the article demonstrated the toothlessness of municipal ordinances prohibiting doing business with companies still trading in South Africa.

The problem with complying with the laws — and laws are exactly what they are — is rooted in the now aging budget dilemma municipalities face. If company A can save a city $50,000 on a computer procurement over company B, company A is going to get the job, its business dealings abroad notwithstanding.

In essence, thrift wins out over morality.

This is not to chide those cities that are finding creative ways to get around their own ordinances. The same people who so vociferously push for South Africa bans might be the biggest advocates of paring every nickel possible from municipal tax rolls.

If anyone or any group — individuals, cities, companies or entire nations — are serious about answering a distant call for help from a scarred land and scarred people, it is a simple fact that doing so carries a price, literally. Computer companies continue doing business in South Africa because they would incur some loss in revenue, profit or market share by *not* doing so. The same applies to individuals, whether they are acting on their own or collectively.

But there is another truth: Nothing works better or faster, especially in today's world, than multilateral economic sanctions against a repressive regime. We have seen proof of this in South America, Central America and the Pacific Basin.

Corporations must serve the interests of stockholders, and government is responsible for spending tax dollars wisely. But neither party should apply a double standard to the South African regime by condemning its excesses while supporting its economy at the same time. Organizations, be they buyers or sellers, should be commended when they agree to take the hit on their bottom lines in the name of shutting off the spigot to South Africa. Conversely, those who won't make such sacrifices should own up to what they are really doing: supporting a government whose policies are increasingly being recognized as indefensible.

LETTERS TO THE EDITOR

A neutron bomb

President Reagan was fully justified in vetoing the omnibus trade bill [CW, May 9] because it contained a plant closing section. The computer industry needs healthy customers to purchase its products more than it needed that bill. The provision would have been costly in terms of money, jobs and productivity.

Many financially troubled employers are fighting for survival. They may not know six days in advance, let alone 60, whether they will be forced to close or require layoffs. In addition, the public announcement of a pending layoff may jeopardize continuing attempts to attract the new capital or contracts that could keep a plant in business.

Sixty-day notifications have a tendency to be self-defeating. Once companies declare their intentions, suppliers stop supplying, banks withhold credit and 60-day notifications become six-day notifications. European companies have responded to European plant closing laws by building plants in the U.S. The proposed trade bill would have chased those jobs away.

Most major European countries have had such laws since 1975. In that period, Europe has created virtually no new jobs. Europe's average unemployment rate has risen from 4% to more than 10%.

In contrast, since 1975, the U.S. has created more than 26 million jobs. This is, in part, a reflection of the fact that the U.S. has also created or started more than six million new businesses since 1975. All of Europe has created fewer than 500,000 in the same period.

Clearly, the need for plant closing legislation is lacking, and the harm it can do to entrepreneurs who create the most jobs is self-evident. This legislation was an economic neutron bomb, destroying businesses and jobs and leaving people standing in the unemployment line.

Daniel John Sobieski
Chicago

Successful team

My wife and I truly enjoyed reading "True compatibility" [CW, May 2].

We launched our careers in the office automation industry 10 years ago in completely opposite scenarios; mine was in distribution of microcomputer hardware, software and ancillary products and my wife's was in the micrographics and then the microcomputer industries.

We joined forces five years ago, discovering we had mutual business practices that were cohesive and goal achieving.

We also found that with a mutual interest affecting our life as a whole, we exude a strong dedication for success. To rely on our many strengths while buffering each other's shortcomings has resulted in a well-oiled partnership with dedication, loyalty, respect and the ability to interact in an efficient, productive manner.

Even so, people still shake their heads when hearing about mates who work together.

Our main notoriety is our working relationship and team leadership abilities. Our unique capability to communicate our ideas and the ability to enact our concepts is so well received that any desire to quit consulting and get a "real job" keeps being put off.

Alan and Madeline Weisberg
Canoga Park, Calif.

A little of both

We believe a major omission was made in "Your choice: Public or private electronic mail" [CW, April 18], because there was no discussion on how to achieve the best of both worlds.

Computer Application Services, Inc.'s Electronic Mail System (EMS) has been providing an environment in which companies may establish their own private EMS networks. When information needs to extend beyond the scope of those networks, EMS will coordinate the delivery of messages to and from most of the common carrier networks.

In fact, in one example mentioned in the article, the software that runs on Continental Holding Co.'s IBM mainframe and handles inbound and outbound Easylink traffic — from Western Union Corp. — is EMS. That system is used for in-house communications and for communicating with suppliers and public storage warehouses. In some cases, messages are computer-generated orders designated for delivery through Computer Application's Easylink gateway to a supplier or warehouse asking for product shipment to another location. This can make communication very much a hands-off process.

Randy Bunderman
Vice-President
Computer Application Services, Inc.
Irvine, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Dashing for high-tech mastery?

It seems the computer generation race has slowed to a tortoise's pace

CHARLES P. LECHT

Reliable computer manufacturers issue model numbers to variations in new products for four basic reasons:

- They don't want to lose the advertising momentum built up over time and at great cost to identify their product.
- They don't want their product to suffer premature obsolescence.
- They wish to convey the message that they are always improving the product — in other words, undergoing change while at the same time remaining virtually the same.
- They wish to inform customers that they are perpetually broadening the product into a line of machines of the same family, so that in whatever direction customers wish to move, they can do so easily.

We are still facing a blizzard of product announcements in the late 1980s. But you may have noticed that people speak less frequently now about generations of technology. The accelerating waves of technology and economic change have so battered vendors that mounting a next-generation advertising campaign could consume more time than the generation endures.

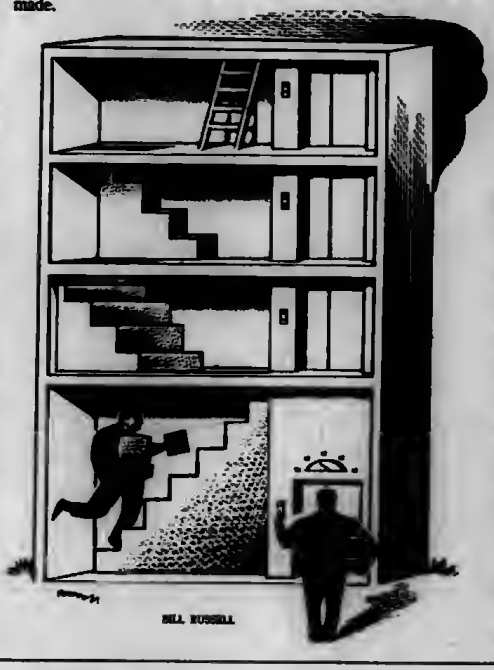
The last major generation proclamation may have occurred around 1982. The Japanese announced that academia, business and government were joining forces to create a fifth generation of computer systems — as if we all knew what the first four generations were.

Computer scientists throughout the world took note of this proclamation. It promised a machine that would embody anything anyone could ever dream possible in computer technology. This machine would be the ideal artificial intelligence engine capable of inductive and deductive learning and would be able to apply its knowledge better than a human could.

The objectives of this fifth-generation dream machine were nothing new in the realm of computer science yearnings and, to one degree or another, had already been achieved. What was new was the promise that the machine would be created to meet its objectives in a way that surpassed anything previously made.

Reaction to the announcement outside Japan can be described as hysterical. Was the U.S. about to be surpassed by Japan in the world race for supercomputer supremacy?

Those who remained level-headed may have suspected other motives were being served rather than just point out that American computer technology might be falling behind.



BILL RUSSELL

For example, was the fifth-generation effort being portrayed as a *honto ne* (Japanese for "really") hair-raising threat in order to raise public funds for research by American governmental defense agencies? If this sounds unlikely, consider that the initial funding for Japan's fifth-generation project — estimated to span five years — equaled roughly what just one U.S. research agency would spend in one year on the same topic.

The hype over the fifth-generation computer has vanished. Gone are the days that governmental conferences were held to thwart the threat that the Japanese archipelago represented to American supremacy in computer technology. Now, industry spokesmen in both the U.S. and Japan have decided that the generation game is a losing one. Their technologies are so interdependent that much more is to be gained by cooperating than competing.

That no one is talking about the sixth generation may well signify that the fifth-generation stuff we've now abandoned is the last generation we'll hear about. The notion of computer generations may have been laid to rest. Users can relax and enjoy the benefits of computer center evolution instead of revolution.

Lecht is an IDG News Service correspondent based in Tokyo.

Take a load off and join the departmental support club

NAOMI KARTEN

Most information centers support vast numbers of end users, all of whom have individual needs, time frames and agenda. One way to help information center staff avoid becoming overwhelmed is to provide services that focus on departmental rather than individual support.

When centers respond to individual requests, they are subject to several syndromes:

- The "demand-driven" syndrome: The phone rings nonstop, and every call is of the gotta-have-it-now variety.
- The "it-was-a-good-break-from-work" syndrome: Users attend training courses and then don't use what they learned.
- The "neglected-to-do-list" syndrome: Staff members plan a day's work and then fall hopelessly behind because of 200 interruptions before their first cup of coffee gets cold.
- The "that's-what-you're-here-for" syndrome. Some user managers view end-user computing as the information center's job, not their own.
- The "learning-curve-ain't-what-it-used-to-be" syndrome. Teaching an intro to this and an intro to that is easy. But supporting users who are all over the learning curve isn't.
- The "so-what-have-you-done-lately?" syndrome. Management keeps requiring the information center to justify its existence.
- The "make-do-with-what-you-have" syndrome. Even when there is a compelling need for additional staff, convincing management to add any is difficult.

Departmental support addresses the causes of these syndromes. Like the MIS approach to systems development, it acknowledges that departments have different computing needs and recognises the value of fitting services to these needs.

Most important, it accepts the center as a finite resource that can't do everything for everybody. Departmental support means that the center provides service in accordance with an agreement with the division head regarding his group's computing needs, problems and goals. Services are based on departmental priorities, jointly determined support levels and clearly defined information center and user responsibilities in attaining those levels.

Departmental support hinges on developing a relationship with division heads. At least quarterly, center and end user representatives should meet to review the department's needs and the status of its computing environment. Each meeting includes a review of the center's effectiveness and an assessment of its achievements.

The result is a service-level agreement that delineates the department's needs and priorities during a specified period, how the center will address those needs and what the center and the department must do to ensure that needs are satisfied.

For example, an agreement with the Department of Financial Wizardry (Finwiz) might include the following items:

Several employees will need introductory training. The center will identify relevant courses, and end users will be enrolled in classes closest in time to the scheduled arrival of their PCs.

Finwiz needs small data bases. The center will schedule a class that will revolve around the development of a data base, which the department will then use. The division head will designate someone to be the department's data base specialist.

The center will respond to problems within four business hours. But first, the caller must collect the specified diagnostic information. Urgent problems may be called in at any time by a designated Finwiz person. Quarterly meetings will review the center's responsiveness and the steps to take to reach faster resolution of problems.

The center will support Finwiz's top priority — the 1989 budget — ahead of any other request. The department will inform the center as priorities change.

How can this department orientation eliminate the syndromes noted above?

- **The demand-driven syndrome.** Through agreements negotiated quarterly, information center staff can gain some control over what they do at what time and for whom.
- **The it-was-a-good-break-from-work syndrome.** Students can enroll in center classes on a need-to-know basis. Classes can be geared to specific departments and oriented toward their identified needs.
- **The neglected-to-do-list syndrome.** There's no such thing as unchanging priorities, but the activities of center staff can be less dictated by the hourly whims and nonstop demands of the five, 17 or 123 individual members of a department.
- **The that's-what-you're-here-for syndrome.** User managers can become more conversant with their computer responsibilities and more articulate about their computer needs so they can meet their end of the service agreement.
- **The learning-curve-ain't-what-it-used-to-be syndrome.** By having user managers specify their training priorities, the center can place emphasis where each department needs it most.
- **The so-what-have-you-done-for-me-lately? syndrome.** The center and the departments it supports can jointly document achievements and ensure that management stays informed about accomplishments.
- **The make-do-with-what-you-have syndrome.** The center's ability (or inability) to meet service-level standards can help signal the need for additional staffing. The center can get help from all those users who've said, "You're doing a great job, but we need more of you."

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

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SOFT TALK

Diane Hickey

Ada nips Cobol in MIS test

An experiment conducted by the Ada Laboratory of Grumman Data Systems (GDS) in Bethpage, N.Y., suggests that with some added routines, Ada may surpass Cobol in regard to economy and reliability in MIS applications.

The 1987 experiment, a conversion of a small Cobol accounting program into Ada, is reported in a GDS study entitled, "A Comparison of Ada and Cobol in a Business Application."

GDS is the division at Grumman Corp. responsible for internal, commercial and defense computer systems development and integration. The Ada Laboratory studies the potential of Ada and writes software programs for GDS research projects.

"The military is starting to apply Ada to business systems," reports John Litke, a GDS deputy director of technology. "The Army already requires that Ada be used in MIS systems as well as in mission-critical systems.

"That is one of our reasons for studying Ada's commercial potential. Another reason is that we believe Ada will eventually allow us to build more economical and more reliable commercial software programs for the computer systems we devel-

Continued on page 28

Shell merits praise

Early users give thumbs up to Alcorp's KBMS

BY NELL MARGOLIS
CW STAFF

On the eve of the commercial rollout of the Knowledge Based Management System (KBMS), the IBM mainframe-based expert systems shell from Waltham, Mass.-based Alcorp, Inc. — formerly Artificial Intelligence Corp. — early users voiced general satisfaction with the software's performance, enthusiasm about its progress and excitement about its potential.

KBMS debuted in February as an expert systems builder able to integrate knowledge-based processing with existing corporate data bases on either an embedded or stand-alone basis.

Targeted at large companies for use in large-scale production applications, the software — written in C and touted as being able to access IBM's DB2 and SQL/DS relational data bases — was developed in close coordination with several Alcorp users, collectively designated The KBMS Consortium.

"When we first heard about KBMS, we thought it had a lot of promise," said Michael Mushet, manager of technology research for the information services department at Southern California Edison Co., a consortium member. "After working with it for a while, we know it's got a lot of promise."

A $5.4 billion company whose 17,000 employees serve 3.8 million accounts across 50,000 square miles, Edison used KBMS to create a prototype load-forecasting application to predict electricity demand.

"We need this kind of tool,"

Continued on page 24

Cook shares recipe for revamped VM Software

At its annual user conference, held in Washington, D.C., last week, VM Software, Inc. presented itself as an entirely new company from what it was last year. Talk of the IBM 9370 and VM Software's core product line — VM utility software — took a backseat to new strategies.

If VM Software has its way, it will emerge by 1990 as a systems software supplier for multiple hardware platforms on corporate networks. VM plans to announce the acquisition of a network management product within a week. This follows the acquisition of Systems Center, Inc., an Irving, Texas, firm that sells the Network Data Mover.

In an interview last week with *Computerworld* senior writer Rosemary Hamilton, VM Software Chairman Bob Cook out-

VM Software's Cook

lined the plans designed to change the company.

Why is VM Software moving beyond its traditional business?

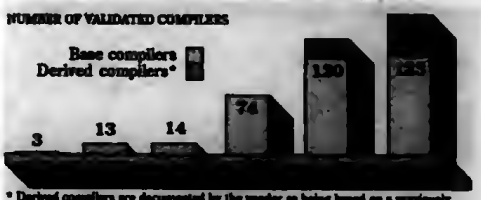
It was a problem of scale for us. The VM market has a com-

Continued on page 28

Data View

Ada compiler supply grows

The Ada market is expanding, as witnessed by the escalating number of compilers approved by the National Bureau of Standards



* Derived compilers are documented by the vendor as being based on a previously approved base compiler and then ported to a different processor

INFORMATION PROVIDED BY ADA INFORMATION CLEARINGHOUSE
CW CHART

IBM talks distributed data bases

BY ALAN ALPER
CW STAFF

NEW YORK — IBM shops contemplating distributed data base management systems should start planning now if they intend to fully implement such architectures early in the next decade.

That was the advice offered by Jnan Dash, IBM's manager of data systems strategy — the industry giant's self-proclaimed "longest living DB2 planner" — at a recent meeting of the Data Administration Management Association here.

Dash enumerated several a priori requirements for success-

Continued on page 24

Inside

- A Unix-based integrator from Allied. Page 20.
- Hypertext encourages managers in Vermont. Page 20.

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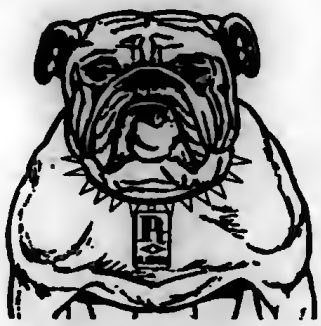

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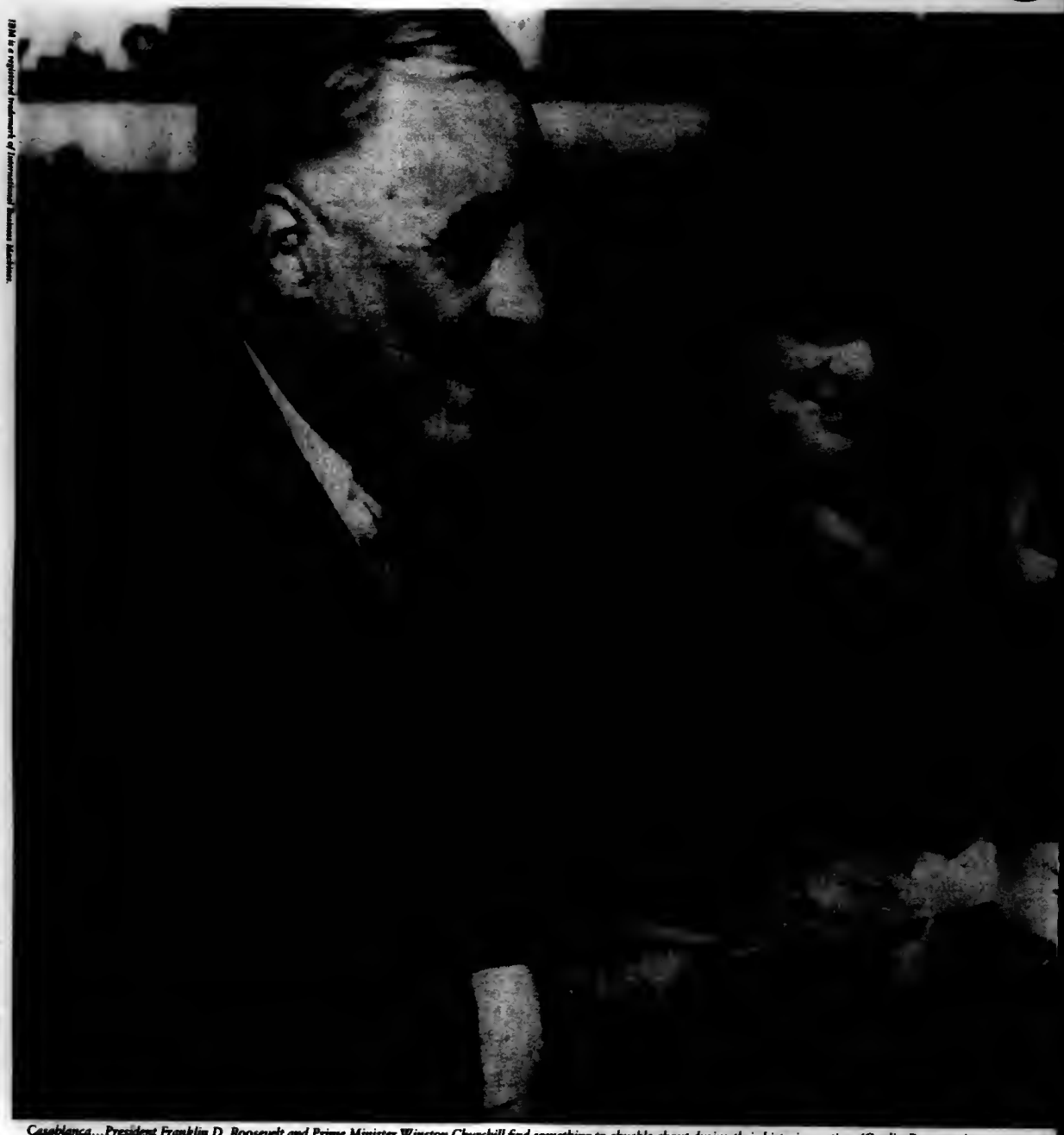

Casablanca...President Franklin D. Roosevelt and Prime Minister Winston Churchill find something to chuckle about during their historic meeting. (Credit: Bettmann)

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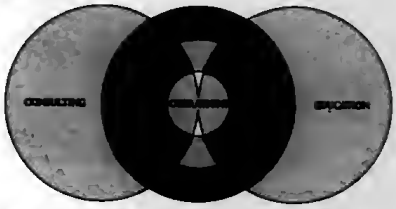

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Shell merits

CONTINUED FROM PAGE 21

Mushet said. "If you look at the whole big world of business problems we have, only a small portion are clear-cut and unambiguous; these we can handle with procedural applications."

Applications such as load forecasting, however, "are based on the laws of nature, not the laws of man, and are constantly changing." In such instances, Mushet said, the flexibility inherent in KBMS's use of both backward- and forward-chaining reasoning methods, as well as the ease of use afforded by a particularly sophisticated intelligent editor, has served to ingratiate the Alcorp product with its first Edison users.

KBMS won similar kudos at Transamerica Insurance Co. in Los Angeles, where its consortium assignment was a prototype expert personal automobile underwriting system — a critical application for the $1.5 billion property and casualty insurance company.

"Thanks to KBMS's built-in editor and its ease of creating external tables, it appears the maintenance of our existing [mainframe-based] applications will be drastically reduced," said Transamerica systems administrator Larry Strong. "KBMS will take some of the updates out of the system. That's a big relief right there."

Along with Strong and Mushet, Mike Golibersuch, information systems consultant at Boston-based consortium member Liberty Mutual Insurance Co., also hailed the tight integration of KBMS and Alcorp's flagship product, the Intellect natural language interface, as a signal benefit to developers working in the traditional large corporate environment.

Both Strong and Mushet conceded, however, that KBMS's real stress tests lie ahead — at Transamerica, when what is now a prototype, basically batch application is mobilized into the company's 4,000-employee nationwide field, and at Edison, when the region's summer weather brings on the threat of air-conditioner overload.

"We don't know yet how KBMS will respond to large numbers of simultaneous users," said Don Prado, applications development manager at Transamerica. "And if it can handle them, we don't know at what cost in overall computer resources."

Nevertheless, the consensus of consortium users seemed to be that KBMS's strengths are desirable enough to make its weaknesses worth overlooking.

KBMS is not as sophisticated as some shells, but it has the advantage of being "more tightly integrated into the traditional DP environment," Golibersuch said. His department is using the Alcorp offering to create an embedded expert system that will first screen out all automobile insurance applications that require an underwriter's detailed attention for approval and then go on to advise the underwriter.

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IBM talks

CONTINUED FROM PAGE 21

ful distributed data base implementation, including relational data base technology in the form of DB2; a common SQL implementation across systems; Systems Application Architecture to provide a common programming interface; and LU6.2, because of its robust session manager.

Without providing specific dates, Dash reiterated IBM's often-stated strategy of phasing in distributed data base capability in the next few years. IBM's strategy begins with distributed access to centralized data. "The objectives are very simple," Dash said. "What we'd like to do is provide location transparency in stages because of the complexities involved." The process picks up steam next month, when IBM is expected to release OS/2 Extended Edition 1.0.

Dash spoke of distributed requests for data as IBM's first objective. "Am I talking about distributed data? No. I'm talking about data that is centralized. But we're opening up the door for remote access," he said.

Users are already able to invoke a rudimentary approach under DB2 that IBM calls user-assisted distribution. This approach permits users to extract and load data from remote systems. "This is fine for infrequent users," Dash said but, he added, not sophisticated enough for heavy use.

A more robust implementation is slated to come early in the next decade with the maturing of technology currently under development at IBM's Santa Teresa Laboratory in San Jose, Calif., as part of its R Star program. One approach, Snapshot, would provide a system-controlled method for making multiple copies of tables that could be extracted and viewed from remote systems.

Before establishing a distributed DBMS plan, IBM shops should look at both existing and projected data and decide whether they require distributed access or distributed data, Dash said. Firms should also evaluate communications costs involved with distributed data bases, which are orders of magnitude higher than they might expect.

Data integrity, user authentication, transaction consistency and predictability of performance will have to be guaranteed before IBM releases distributed data capabilities, Dash said. Many shops may want distributed data base management, he said, but most realize it will be a long time before they will be able to contend with all of the complexities involved.

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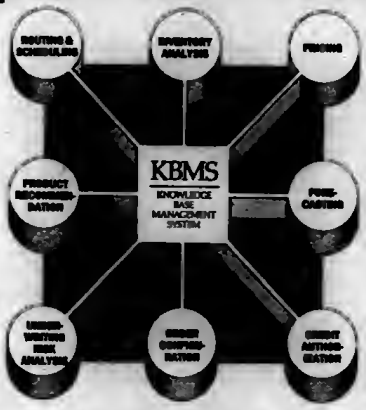

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Cook's recipe

CONTINUED FROM PAGE 21

pounded growth rate of 20% to 25% a year. But take a look at Computer Associates. They can spend about $50 million a year in promotions. We tend to get lost in that. We need to be larger than we are to survive in the long term.

We hope to be $50 million this year and $100 million in 1989. We can do that through acquisitions. That's the way we have to go.

How do your customers feel about your intentions to move beyond the VM systems software market?

I think some of them are real VM bigots, and they don't like it. They're afraid we'll confuse our efforts. But the reality is we have to talk to a number of different platforms that exist on today's networks. We'll keep stressing our commitment to VM. But even if they don't like [our plans], it is where we are going.

What other hardware platforms will you port the company's utility software to?

Well, there are more VAXs around than most other systems. Prime and Tandem are two other obvious choices. In the next year, we don't plan to move to more than one other platform. We'll grow with that, and if we've overstepped, then we'll slow [production] down.

What technologies will you acquire?

We're interested in network management. It's a new area, and IBM hasn't really fleshed out Netview yet. We're also interested in the lights-out operations area.

Are you concerned that the company is taking on too many projects and may end up spreading itself too thin?

We worry about that all the time. But we will continue with a narrow focus — systems software for multiple hardware platforms.

What is the acquisition you will be announcing in a few weeks?

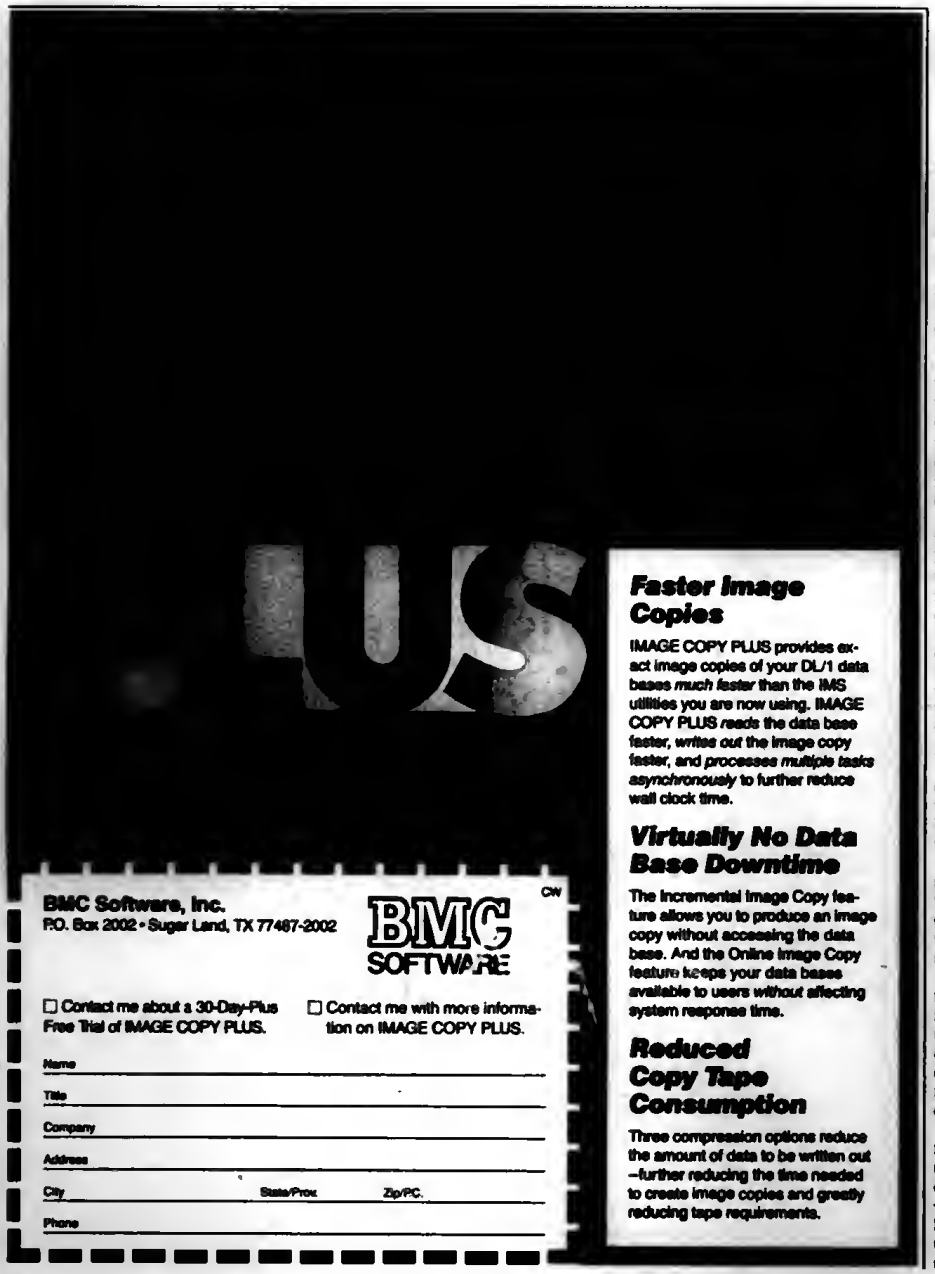
It's an extension of the telecommunications area. That's all I can say now. We're talking to a number of companies.

Do you plan to follow IBM's lead in price cutting for low-end 9370s as well as the creation of a new pricing category?

We've always followed them, but we're still looking at that.

Have sales picked up for VMCenter II to 9370 customers?

There's interest, but there's not a lot of 9370s out there. When more communications software comes out for it in October, then the 9370s should get moving. I'd say by the first quarter of 1989. I think they'll sell 50,000 of them within five years.



Hickey

CONTINUED FROM PAGE 21

op and integrate."

Among the user benefits that favor Ada over Cobol in the conversion experiment were the following:

- Ada program units can be compiled separately, with a compiler checking for errors across the units, thereby preventing interface errors.
- Ada's exception-handling capabilities allow recovery from more types of errors than Cobol.
- Ada's block structures make possible the design of a more modular program.

The test

The business application selected at Grumman for conversion to Ada is a Cobol transaction register program, which includes a reporting routine. The accounting program in Ada provides report item editing capabilities similar to Cobol's.

The accounting program reads a customer transaction file and performs calculations using numeric input — transactions and credit amounts — to produce a monthly transaction report, an invalid-data report and a listing of run statistics.

The Ada and Cobol programs were developed on different systems. The 1974 ANSI-standard Cobol program was developed on a DEC VAX-11/782. The 1983 ANSI-standard Ada program was developed on a Data General MV8000 and ported to a VAX-11/780.

In order to successfully perform the experiment, a package was written in Ada with a function that provided one of Cobol's features: the ability to edit report time.

In the course of the experiment, the similarities and differences between the two languages were noted in regard to design purpose, structured language, portability, separate compilation and coding style.

At a more detailed level, note was made of comparative program design methodologies, file handling, program units, data and its description, operators, executable statements, structures and exception handling. In all of these categories, Ada was found to be as capable as, or more capable than, Cobol.

The study reporting the experiment noted that in some Cobol-to-Ada conversions, the amount of code was dramatically reduced.

Hickey is a systems analyst at Grumman Data Systems. She specializes in software methodologies and tools.

NEW PRODUCTS

Systems software

A Unix-based package that was developed to integrate production, engineering and management systems has been announced by **Hilco Technologies.**

According to the vendor, **Monitrol** is a menu-driven, user-configurable system that will interface with intelligent plant floor and plant host systems to form a plantwide manufacturing information facility. The software runs exclusively on Hewlett-Packard Co.'s 9000 series of computers and includes a real-time data base that incorporates process graphics, alarm logging and statistical control charting.

Monitrol costs approximately $20,000. Requisite HP hardware costs from $40,000 to $50,000.

Hilco, 3015 S. Brentwood St., St. Louis, Mo. 63144. 314-961-2160.

Applications packages

Weyerhaeuser Information Systems has announced several enhancements and a new platform for **Worksmart**, its maintenance management software designed to decrease maintenance costs in manufacturing operations.

The system reportedly tracks equipment records, work orders, preventive maintenance scheduling and inventory records. An integrated graphics system module, designed for the Hewlett-Packard Co. HP 3000 minicomputer series, and a bar-code data entry module have been added, and a version of Worksmart for the IBM System/38 is available.

The graphics and bar-code software modules cost $5,000 each. Worksmart for the IBM System/38 costs $35,000.

Weyerhaeuser, Mail stop CCB-3C, Tacoma, Wash. 98477. 800-654-9347.

A graphics software package for Cray Research, Inc. machines has been released by **Precision Visuals, Inc.**

The **DI-3000 XPM** program reportedly allows application developers to build and manipulate objects using a world coordinate graphics data manager.

The package provides simulation, modeling and design capabilities in a device-independent environment. Users can create an application on a workstation, transfer control to the Cray processor for number crunching and then bring the results back down to the workstation for viewing.

The Cray version of DI-3000 XPM is tailored specifically for the Cray Unicos operating system, and the product supports the ANSI-standard Computer Graphics Metafile format.

DI-3000 XPM costs from $3,300 to $57,000.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

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Middlesex, England... The Government has announced that 40,000 additional men will be needed by the Royal Air Force—most of them in the next 18 months—on top of the present strength of 70,000. Pictured here is a line of smart recruits being transformed into well-drilled, confident soldiers. (Credit: Bettmann)

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MICRO BITS

Douglas Barney

Giants war on bus front

Users win. This is the kind of battle users love to see. It is a clash of giants, each trying to put the most powerful workstation on users' desk tops.

The participants, IBM and Compaq, are pushing Intel microprocessors and high-speed random-access memory to their outer limits. Each now has a 25-MHz desktop announced or shipped, and that's just the beginning. As Intel ups its chip speed, IBM and Compaq will quickly plug 'em into systems.

But the key difference in artillery will be on the bus front. Some from IBM say the Micro Channel will give that firm the eventual title of "king of the desktop speed wars." If IBM is right, it will help settle the Micro Channel issue.

As holder of the industry-standard torch, Compaq says the old bus, with some polishing, will do just fine. Just in case it doesn't, Compaq is continuing to evaluate other high-performance buses, such as the Micro Channel, Nubus and some alternative 32-bit buses.

So fight on, in the name of faster PCs.

Continued on page 40

Micros on move in IBM future

Company's move from PCs will fire demand for mainframes, study says

BY ALAN J. RYAN
CW STAFF

LOS ALTOS, Calif. — During the next four years, IBM will continue its migration to new micro-based systems in an effort to generate demand for its mainframe computers. At least that is the theory put forth in an upcoming report from the International Technology Group (ITG), based here.

According to the study's author, ITG managing director Brian Jeffery, the Personal System/2s of 1992 will bear little resemblance to the company's 1988 offerings. Jeffery said IBM's OS/2 and proprietary Micro Channel architecture are also interim offerings.

OS/2 will lead users to a new operating system that will run on microcomputers, minicomputers and mainframes, Jeffery said. "It will no longer be just a discrete system on the PC."

A look ahead

The study, slated for release in early August, is based on an analysis of IBM product plans, positioning and research and development activities affecting the company's workstation product lines, according to ITG.

The PS/2 is the result of an internal IBM program that began in 1983, ITG said. That program abandoned the original concept of the stand-alone, personal-user personal computer.

Development for the PS/2 has been closely coordinated with IBM development activities for other systems, which will lead to new product lines in 1992, ITG predicted.

The new lines will include intelligent ASCII workstations, which will be made by merging the current PS/2 Models 25 and 30 with IBM's 3160 and 3150 lines of ASCII terminals to form inexpensive, mass-produced commodity products.

Also in the lines will be intelligent 3270 workstations. Jeffery said the PS/2 Models 50 and 70 will merge with IBM's 3190 dumb terminal line. OS/2 Extended Edition and the Micro Channel architecture will evolve into an environment designed primarily for host coprocessing, the report predicted.

Additionally, the high-end PS/2 Models 60 and 80 will evolve into 370, System/36 and 38 and other IBM mid-range systems. The high-end PS/2 models will then form a bridge between the OS/2 environment and the 9370 and upcoming Silverlake environments, Jeffery predicted. The PS/2 Model 80, for example, will become the low end of both the 9370 and Silverlake, running the VM and System/36 and 38 operating systems, respectively.

"IBM is effectively out of the personal computer business and is no longer interested in stand-alone PCs," Jeffery said.

Data View

Desktop presentations see colorful future

Color hard copy should be fastest growing segment, taking its biggest bite out of monochrome printers

INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Microrim readies compiler

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — While Ashton-Tate Corp. has so far declined to unveil a true compiler for its market-leading Dbase III, its competitors have fewer qualms.

Sources reported recently that Borland International is readying a compiler for its Paradox data base management system. But Microrim, Inc. will beat Borland and Ashton-Tate to market with an announcement next week in New York of its $1,000 R:Base Compiler.

The product is scheduled to ship this fall.

According to Microrim, the compiler offers several advantages for developers. In addition to the product's improved speed, developers can produce secure code through the creation of stand-alone .EXE files. Data access is about twice as fast as with

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Inside

- Kapor stays busy with On Technology. Page 33.
- I'll buy that: Amway adds PCs to arsenal. Page 33.
- Fortran rolls out 386-based systems. Page 41.

Micro Focus COBOL for Mission Critical Programming

Success in the growing Electronic Data Interchange (EDI) software market depends on good business sense and a top-level product. Supply Tech, a leading EDI software vendor, decided that good sense and Micro Focus COBOL products go together for PC applications.

Supply Tech President Gail Jackson chose Micro Focus COBOL. "We built our PC applications from a base of mainframe COBOL code and expertise. Micro Focus COBOL supports the mainframe commands we need. And Micro Focus run time routines let us do things from COBOL that we would have had to do in assembler on the mainframe," she says.

"Our mainframe-trained programmers love debugging with the Micro Focus ANIMATOR because it's so easy to use and lets us really see what's going on inside the program."

Supply Tech also likes Micro Focus COBOL portability. "We're looking hard at OS/2 as a platform for further market expansion. When we make that move, we'll do it knowing that Micro Focus COBOL will be there."

Join professional developers like Gail Jackson and find out about the Micro Focus "Better Way of Programming." And do it before your critical mission becomes your mission impossible.

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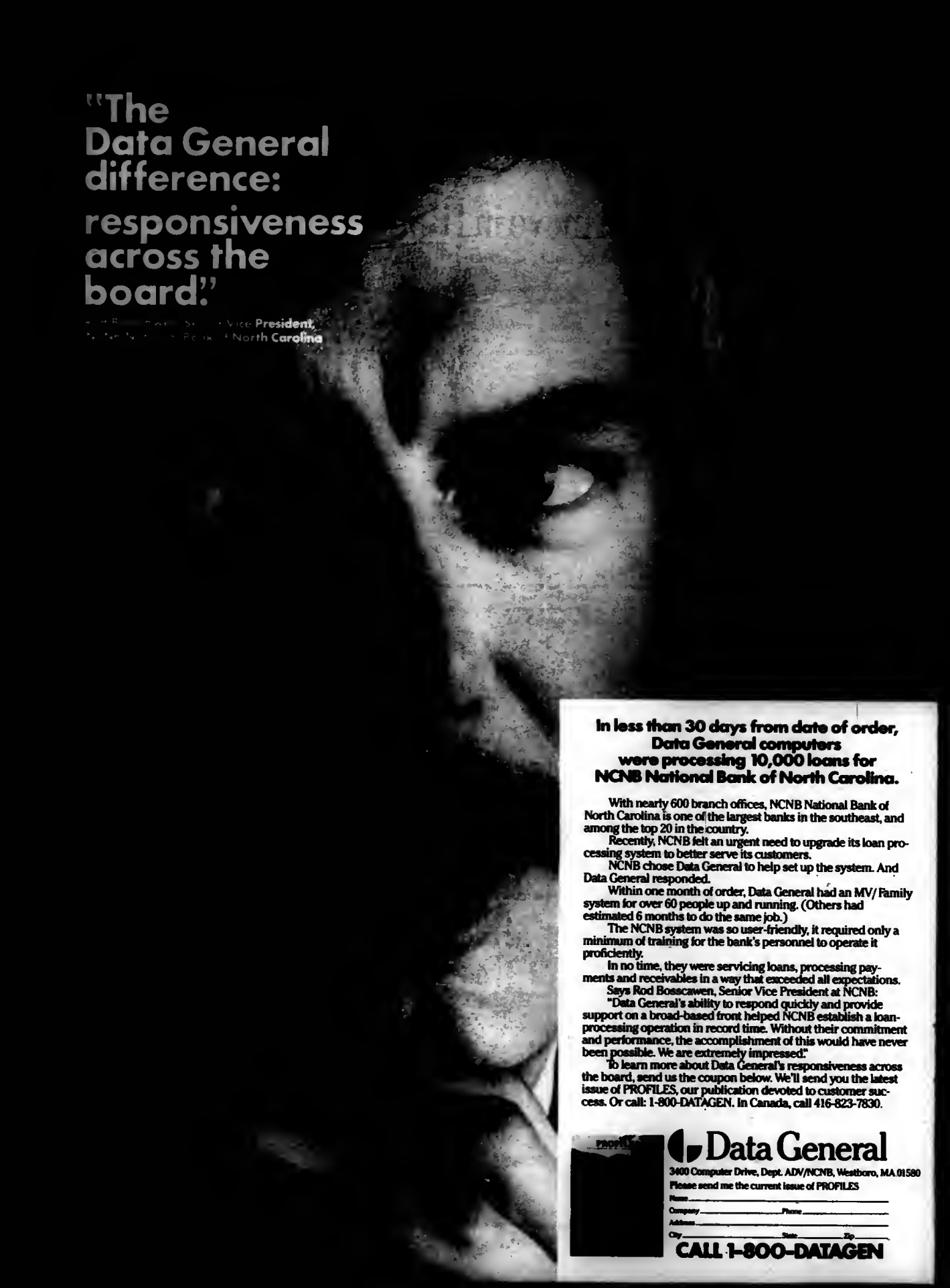
"The Data General difference: responsiveness across the board."
Vice President,
North Carolina
In less than 30 days from date of order, Data General computers were processing 10,000 loans for NCNB National Bank of North Carolina.
With nearly 600 branch offices, NCNB National Bank of North Carolina is one of the largest banks in the southeast, and among the top 20 in the country.
Recently, NCNB felt an urgent need to upgrade its loan processing system to better serve its customers.
NCNB chose Data General to help set up the system. And Data General responded.
Within one month of order, Data General had an MV/Family system for over 60 people up and running. (Others had estimated 6 months to do the same job.)
The NCNB system was so user-friendly, it required only a minimum of training for the bank's personnel to operate it proficiently.
In no time, they were servicing loans, processing payments and receivables in a way that exceeded all expectations.
Says Rod Bosscawen, Senior Vice President at NCNB:
"Data General's ability to respond quickly and provide support on a broad-based front helped NCNB establish a loan-processing operation in record time. Without their commitment and performance, the accomplishment of this would have never been possible. We are extremely impressed."
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SMALL TALK

William Zachmann

IBM bus up the creek?

With all the talk about IBM's Personal System/2 Micro Channel architecture prior to the Comdex/Spring '88 show in Atlanta early in May, you'd have thought we'd be awash in PS/2 clones by now. Obviously, nothing of the sort has happened.

Sure, Tandy announced an Intel 386-based system with five Micro Channel slots that is supposed to be available in Radio Shack stores shortly. And Dell Computer announced 286 and 386 Micro Channel compatibles too, but these aren't due for months yet. A couple of other vendors that hardly anybody has heard of have also announced intended products, but these are even further in the vapor zone.

The flood of Micro Channel clones that all the makers of compatibility-chip sets were beating the drums about in March and April are nowhere to be seen. In fact, the hottest topic this week (and biggest real threat to IBM) is Compaq's new personal computers based on the "industry standard" AT bus, which blow away IBM's Micro Channel-based PS/2s on performance.

Understanding the reasons why PS/2 Micro Channel clones are proving to be so elusive can tell us a lot about what is going on in the market for PCs today. It also provides important insight both into IBM's overall strategy and into the extent of IBM's problems. Despite all the hype about how many million

Continued on page 35

Kapor hopes start-up buds will blossom; slams faults of today's technology

Mitch Kapor does not have to do a thing. As founder and former chairman of Lotus Development Corp., he is worth many millions. While that kind of nest egg would lead most folks to take it easy, Kapor has been busier than ever, flying regularly to the West Coast to look in on Go Corp., a start-up he is helping to fund that is cranking out a suite of mysterious productivity applications.

But Kapor's real baby is On Technology, an East Coast start-up with visions of changing the way people access information via computers. Like Go, what On is up to remains a mystery. All we know is that the technology will be a set of system software building blocks for others to create applications on, will run initially on Apple Computer, Inc.'s Macintosh and will not be available until sometime around 1990.

Computerworld Senior Editor Douglas Barney recently spoke with Kapor about why he

Lotus founder Kapor remains active in industry

hopped back into the computer business, what is wrong with today's technology and what is in store from On.

Why did you get back into the computer industry?

There were some opportunities to try to achieve some goals that I found motivating. Also, this is what I know how to do; I enjoy exercising my craft.

The position that I was in 10 years ago was, "Look at all this marvelous technology. It is not marvelous for its own sake; it is marvelous in terms of the human end to which it can be put." The opportunity was marrying technology to people's needs.

A decade later, I looked around, and the same thing was still true.

Despite the fact that there have been lot of impressive successes that meant more widespread adoption of computers by ordinary people, they are still frustratingly difficult to use. And there are still lots of things to do with computers that can't be done yet.

What is missing from today's technology?

There is a vast amount of potential for computers as part of a new medium of communication and information — as an actual communication medium.

Today's on-line services and E-mail systems are just the barest beginning of a whole new medium that ultimately will become as important as the printing press and the book.

How do we achieve that?

Some of the most important ideas are not new ideas at all, but in computer terms are very old. They represent a tradition of people who talked about using the computer as a tool to support collaborative work, work in groups and hypertext and hypermedia systems. Those ideas have been around for 30 years or so, but we are just starting to get the technology to let us do some of those things.

So the hardware has gotten better? What will you do with the great new hardware?

Yes. What we are trying to do specifically is create a system software-level platform that would facilitate the creation of groupware and hypermedia applications.

And you are building on technology that is already in existence?

It is building on the results of re-

Continued on page 36

Amway PC gold rush sends sales force out to the streets

BY JULIE PITTA
CW STAFF

ADA, Mich. — Armed with health- and home-care products and a heap of confidence, Amway Corp. "volunteer" salespeople have hit the streets in the hopes of striking it rich. Now, the Amway sales force has added personal computers to its arsenal of selling weapons.

Under an agreement signed last fall, Amway's sales agents are being supplied with personal computers and accessories from Tandy Corp. The arrangement allows Amway to purchase the systems and resell them at a significant discount to its Amway salespeople, called distributors.

To learn how to use the systems, Amway distributors receive training from the nearest Radio Shack retail outlet. With the purchase of a Tandy machine, the Amway distributor receives a copy of Amware, a communications software package that enables the distributor to transmit orders directly to Amway headquarters here. Amware works with any of Tandy's Microsoft Corp. MS-DOS-based microcomputers.

So far, Amway has supplied its distributors with about 1,500 Tandy systems. Jim Stover, director of product marketing at Amway, said sales of the systems are meeting projections.

"The last thing we want to do is encourage everyone to get a PC," Stover said. "The typical distributor just getting started doesn't need one. It's meant to be a business aid for the higher volume distributors."

The typical Amway distributor sells the company's line of cosmetics, detergents and household cleaners and other domestic products in his spare time. Rather than go door-to-door, many sell to friends, family and acquaintances. Amway has 750,000 independent distributors in North America.

Distributors are recruited in what has become a familiar process to many. "They first get to know and believe in the products and want to share them with their friends," Stover said. "If you're a distributor, then you want to share this opportunity with others."

Through the use of computers, Amway hopes to beef up its already healthy $1.5 billion yearly revenue by making selling more efficient.

SOFT TIPS

What's Best is better

What's Best, from General Optimization, Inc., is a Lotus Development Corp. 1-2-3 add-in that provides linear programming capability to determine optimum solutions to mixing factors.

But with 1-2-3 and What's Best already loaded, random-access memory-resident programs may be just too much for your system to handle. Here is how you can tell.

If you receive the message "unable to load OPTIMIZE.EXE" when you try to optimize, you probably do not have enough RAM available. Unload any RAM-resident programs and try again. You can free additional memory by loading 1-2-3 directly rather than through the access menu.

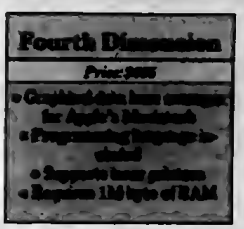
Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

Slowness blocks Acius's DBMS path

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Performance issues may slow Fourth Dimension's struggle to become the leading data base product for Apple Computer, Inc.'s Macintosh.

"It runs too slow unless you use it on a Mac II or a Mac SE with an accelerator board," said Jim Hayes, microcomputer manager at Seafirst Corp., a Bankamerica Corp. subsidiary. Apple's Mac II is based on a Motorola, Inc. 68020 microprocessor running at 16 MHz. Hayes added that Fourth Dimension is a large

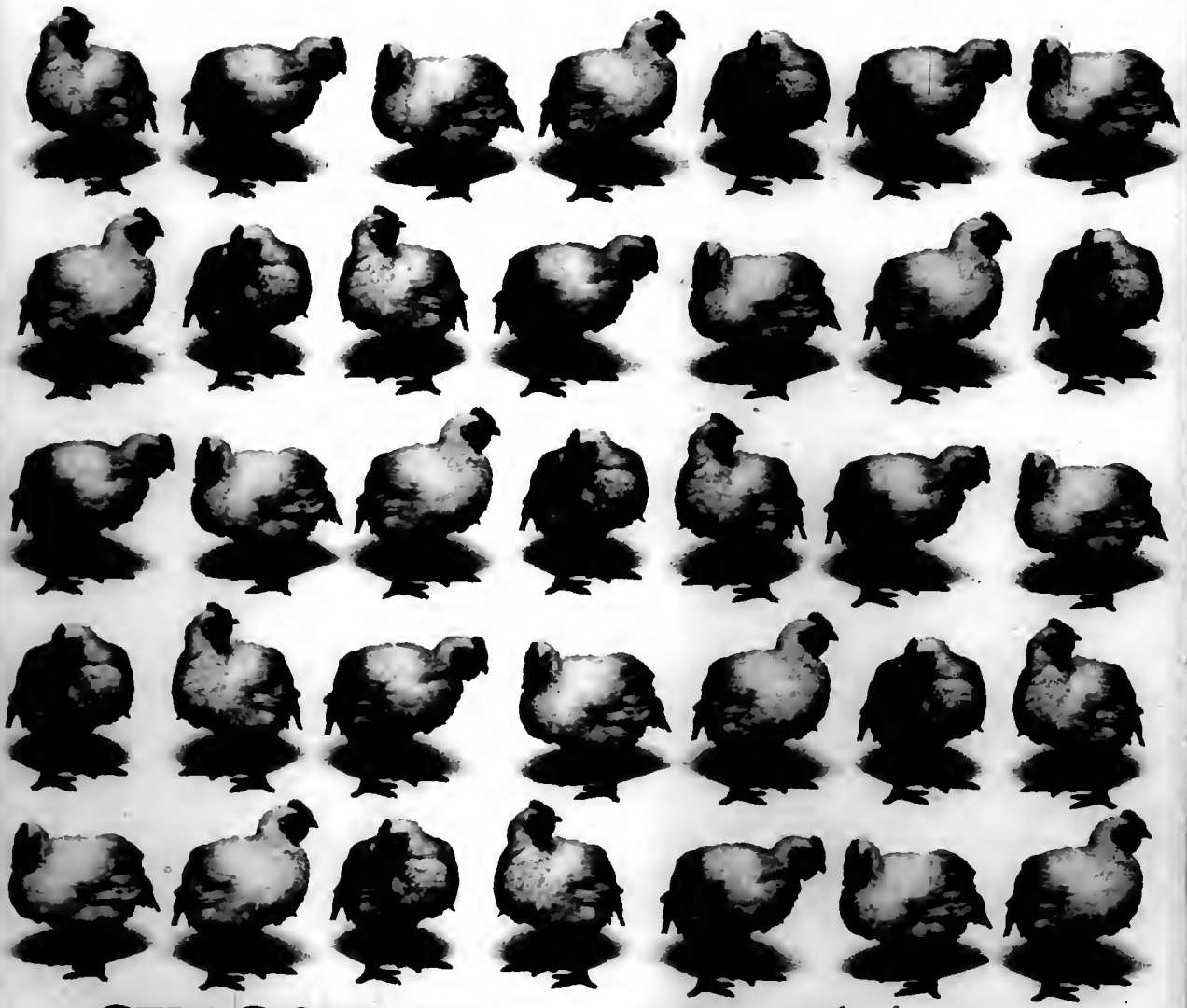


program that requires 1M byte or more of random-access memory, while many of Seafirst's Macintoshes possess only 512K bytes of RAM.

After assessing the Acius, Inc. data base manager, Seafirst opted to stick with Blyth Software, Inc.'s Omnis 3Plus, a version of a data base management package available since 1985. "Fourth Dimension can't do anything that Omnis can't," Hayes maintained. "And the performance on Omnis is good."

Fourth Dimension will be fighting it out in a marketplace that is becoming increasingly crowded. In addition to the Omnis product — the first of its kind for the Mac — other entrants include Odesta Corp. with its Helix family, Ashton-Tate Corp.'s Dbase Mac and Borland International's Reflex Plus.

Continued on page 36



CINCOM Boosts Production At Holly Farms.

***PROBLEM:** Improving programmer productivity in order to reduce a large applications backlog*

***CINCOM SOLVED IT:** With MANTIS Application Development System*

Mr. Bill Clontz
Director of Computer Services
Holly Farms Foods

During a period of explosive growth, Holly Farms found itself with two problems: a large applications backlog and a short supply of programmers able to step in and produce immediate results. The solution was MANTIS,® the application development system from Cincom.®

"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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Zachmann

CONTINUED FROM PAGE 33

PS/2s have been sold, IBM's proprietary Micro Channel architecture, and thereby IBM's PS/2 strategy, is in trouble.

There are two main reasons for the scarcity of Micro Channel clones. For one, IBM intended to make it difficult and economically unattractive for other vendors to clone the Micro Channel and has largely succeeded. The second is that the Micro Channel doesn't really provide any significant advantages over the AT bus. Let's look at these in more detail.

No proof

Despite all the hype, despite all the carefully crafted benchmarks commissioned by IBM to show the PS/2 in the most favorable way possible, the Micro Channel offers absolutely no performance advantages over standard architectures built around the AT bus.

True performance of IBM's Micro Channel machines is no better than that of nearly every other vendor's systems with comparable clock speeds and comparable disk drives.

Nearly every other vendor's 286-based systems offer faster (in some cases much faster) clock speeds and disk drives than IBM's PS/2 Models 50, 50Z and 60. As a result, these IBM models, based on only a 10-MHz 286, are significantly slower than the 12-, 16- and even 20-MHz models available from competitors at lower prices.

IBM's Intel 386-based models at least offer clock speeds and disk speeds comparable to those of competitors. Still, despite the Micro Channel, lots of "industry standard" competitors outperform IBM's models quite handily. Compaq's Deskpro 386/20 easily outperforms IBM's 20-MHz versions of the PS/2 Model 70 and 80. Chances are good that Compaq's new 25-MHz, 386-based system will not only run faster than IBM's recently announced high-end Model 70, but will be available sooner to boot.

What's more, claims that the Micro Channel will offer significant advantages for running OS/2 are absolute drivel. The bottom line is that it offers no real performance advantages for any software, present or future.

The only real functional advantage that can be claimed for the Micro Channel is the self-configuring feature that recognizes a card-type identifier, making dip switches unnecessary. Even this is of dubious benefit. Confusion over card identifiers and attendant problems have actually made this an irritating annoyance for some users. Some card makers have actually added dip switches to make it possible to change the card ID.

The Micro Channel doesn't do anything for anybody but IBM. What it does for IBM is to make it legally difficult and more expensive for everybody else to build Micro Channel clones. IBM's patent licensing fees of up to 5% of vendor revenues, combined with the premium price the semiconductor specialty vendors are charging for PS/2 chip sets, mean that a Micro Channel clone could cost a third-party vendor 25% to 35% more to build than an AT-bus system with the same performance.

Since the Micro Channel does absolutely nothing for the user anyway, it isn't surprising that few are interested in paying a premium for a Micro Channel-bus machine. Those who don't mind spending more for something that does nothing for them are probably willing to pay a little extra for the IBM label anyway.

Zachmann is vice-president of research at International Data Corp.

Digital Research adds DOS system

MONTEREY, Calif. — Who said DOS was dead? Digital Research, Inc. thinks enough of the operating environment to offer a DOS-compatible system aimed at original equipment manufacturers who want a low-cost alternative to Microsoft Corp.'s MS-DOS.

Ironically, earlier this decade, Digital Research missed an opportunity to develop PC-DOS for IBM, a contract that went to Microsoft instead.

DR DOS is a proprietary DOS clone that runs with disk-based systems or can be executable from read-only memory for laptop, portable and diskless personal computers.

The system is reportedly fully compatible with IBM PC-DOS and MS-DOS, supports DOS 3.0 and higher file-level and byte-level record locking and can run most standard DOS applications.

Claiming to go beyond the constraints of MS-DOS, Digital Research said the system supports multiple hard disk partitions extended from 32M bytes to 512M bytes and password protection for files and subdirectories.

Digital Research would not disclose pricing for DR DOS because it varies according to the type and volume of each OEM's use.

Digital Research also announced a graphics version of its Concurrent DOS 386 system that melds multiuser, multitasking capabilities with high-resolution, bit-mapped graphics. The Multiuser Graphics Edition can run multiple copies of both DOS and Concurrent DOS applications. It costs $995 and reportedly will be available in August.

Why We're Betting a Million Lines of Code on the SAS/C™ Compiler.

At SAS Institute Inc., we've invested more than 10 years of research—and over a million lines of code—in the SAS® System, the world's leading data analysis software. So you can bet we left nothing to chance when we chose the C language for the next generation of our software.

We selected C for the portability it would bring to the SAS System, but weren't about to risk our code on just any mainframe C compiler. So we tried them all. When none could meet our exacting requirements, we created our own: the SAS/C compiler.

We Developed It. Support It. Use It.

The SAS/C compiler set new standards for efficiency and technical quality, with:
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- Reentrant object code
- Highly optimized generated code
- Use of standard IBM linkage conventions, with support for 31-bit addressing
- A CMS Rexx/TSO CLIST interface
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- Many built-in functions including string handling
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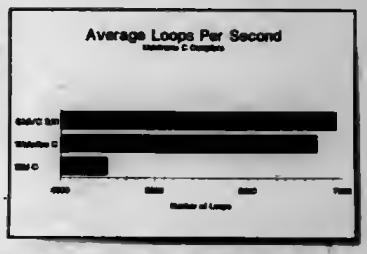

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Acius

CONTINUED FROM PAGE 33

Omnis is the clear leader in shipments, with an installed base of 49,470 at the end of 1987, according to Dataquest, Inc. Dbase Mac is second with an installed base of 15,520, and Odesta's Helix runs close behind with 13,580.

Fourth Dimension and Borland's Reflex Plus are tied with an estimated installed base of 8,730, Dataquest said.

Dataquest analyst Randy Sutherland said Omnis 3Plus and Fourth Dimension are full-featured data base managers targeted at applications developers and large MIS organizations that do their own development work.

Borland's Reflex Plus is "designed for the business user who hasn't written thousands of lines of code," Sutherland said, while Dbase Mac is an attempt to straddle the two. Helix VMX, a special version of Helix, is optimized for the Macintosh to Digital Equipment Corp. VAX minicomputer connection.

Fourth Dimension's appeal lies in its ability to allow developers to create applications with more Mac "look-and-feel" qualities. "It's easier to write Mac-ish applications with Fourth Dimension once you've learned it," Sutherland said. "Using it, you can create applications that conform to the Mac community's standards for Mac applications."

That ability may be traced to Acius's close relationship with Apple. Fourth Dimension — originally called Silver Surfer — was developed by a French software company. Apple had thoughts of marketing the product itself until it encountered resistance from its third-party software developers, who had grown sensitive to Apple's participation in their market.

Instead, Apple's Director of Software Evangelism, Guy Kawasaki, left Apple to become the president of Acius, the American spin-off of the French firm. Acius resides next door to the Apple campus.

Despite its somewhat slow performance, Fourth Dimension has its fans. Jeff Ehrlich, manager of product technology at General Electric Co., said, "It's a full-blown data base manager with a programming language and everything you need."

Kapor

CONTINUED FROM PAGE 33

search that has not yet been successfully commercialized. The components of this thing are going to come from the disciplines of object-oriented programming and object-oriented data bases, knowledge representation, user interface management systems and so on.

Would we be closer to this type of technology if customers made more demands of their vendors?
No. Customers didn't demand the automobile. Once it starts to take off, once there are a few of the key products out there, then the customer demand will become the key critical factor. But until the first few examples of the new genre are there, it is unrealistic to expect customers to play the role of product inventors.

How close do the Macintosh interface and the Presentation Manager get us to some of these goals?
I think that it is a stepping stone, but those components are just a user interface. There are a lot of other components that are necessary to build the new applications on the data base side, the language side, knowledge representation and so on.

To achieve what you want to achieve, you need the help of who?
Ultimately, platforms get established because they have the support from the critical constituencies — hardware vendors, applications developers and end users. We are going to need all of those.

As software gets better, hardware requirements, and thus expense, go up. Will there be a type of software ghetto?
It may not be a function of the ability to afford it. Today it is often the company that makes the purchase decision, not the individual. If they have standardized on an architecture that is insufficiently powerful to run these kinds of applications, they could end up consigning their users to a kind of a software ghetto.

But I think the 10G workstation of today will cost 30% less next year, and the year after. I am not so much concerned with the hardware being too expensive and, therefore, people being shut out of it. I am concerned with the fact that the 20 million or so DOS machines represent a pretty large immovable object. Innovation represents an irresistible force, and when irresistible forces meet immovable objects, the results are quite unpredictable. It will be interesting.

Are you architecting for a move to OS/2?
Yes. We anticipate that if we are successful, we will want to come over to the 386, and we are certainly bearing that in mind as we design.

What are the true innovations?
My short list is Dan Bricklin's invention of the spreadsheet and the Macintosh interface.

Does Hypercard or your Agenda information manager fit in?
It would be fair to add Hypercard. I would love to add Agenda, but I'll only do that if it's commercially successful.

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Barney

FROM PAGE 31

Pick on us all you want: We're rich! It's tough to forget that Ashton-Tate rules the micro data base management system market. If it didn't, why else would its competitors take so many potshots?

The rarely abrasive Microrim got a few jabs in with a recent ad for its R:Base system. Alluding to Dbase IV missing its July ship date, the ad blares, "Sorry, but the next-generation data base won't ship in July." According to Microrim, it is shipping now, and it's called R:Base.

That kind of stuff is pretty mild. Oracle, which has had an adversarial posture toward Ashton-Tate almost since time began, continues trying to rub salt in the Dbase developer's eyes. It still runs the ads portraying Dbase as a plane from the early part of this century going down in flames.

But now, its product announcements are digging at Ashton-Tate's side. Called Dbase Liberator, they include an SQL-compatible Dbase clone and compiler from Wordtech that Oracle will market. These are meant to ease the transition of Dbase users to SQL.

Ashton-Tate folks see things a mite different. According to them, Oracle's one-size-fits-all strategy hasn't worked, and the announcements show that Oracle users want Dbase. They thank Oracle and Wordtech for giving those users a migration path to the Ashton-Tate product line.

Modern Jazz dead. But didn't you just say . . . About a month ago, we heard a report that Lotus was going to kill its Modern Jazz project — a total revamp of the ill-fated Jazz package for the Macintosh — which had already seen a couple of major delays. We called Lotus and asked them about the report. The answer was something like, "Modern Jazz lives; it is just delayed and will ship when it ships." It smelled a little fishy, but that seemed to be the story.

About a week later at Lotus Week, we saw an elaborate demo and forced the demonstrator to push the product to see if it really worked. Despite our best efforts, we couldn't get Modern Jazz to falter. But apparently Lotus quality-assurance people can — and have, repeatedly.

In trying to unravel this tale of software woe, we have come to understand the following: At about the time of our original call concerning the death of Jazz, the development team was asking management for one more month, just one more month, to get some of the tricky data base problems worked out. A month later, the team sought still more time, so Frank King, Lotus's highly efficient new head of software, drew the line. With no finished product in hand, King pulled the plug on Modern Jazz.

One reason to kill the work in progress is a changing marketplace. The market for integrated Mac products is pretty well sewn up by Microsoft's Excel. So Lotus will focus on developing a version of 1-2-3 for the Macintosh. This product will support Lotus's new development language and data sharing protocol. Perhaps more importantly, 1-2-3/Mac will help Lotus become the Oracle of spreadsheets. Distributed spreadsheets, anyone?

Barney is a Computerworld senior editor, microcomputing.

Microrim

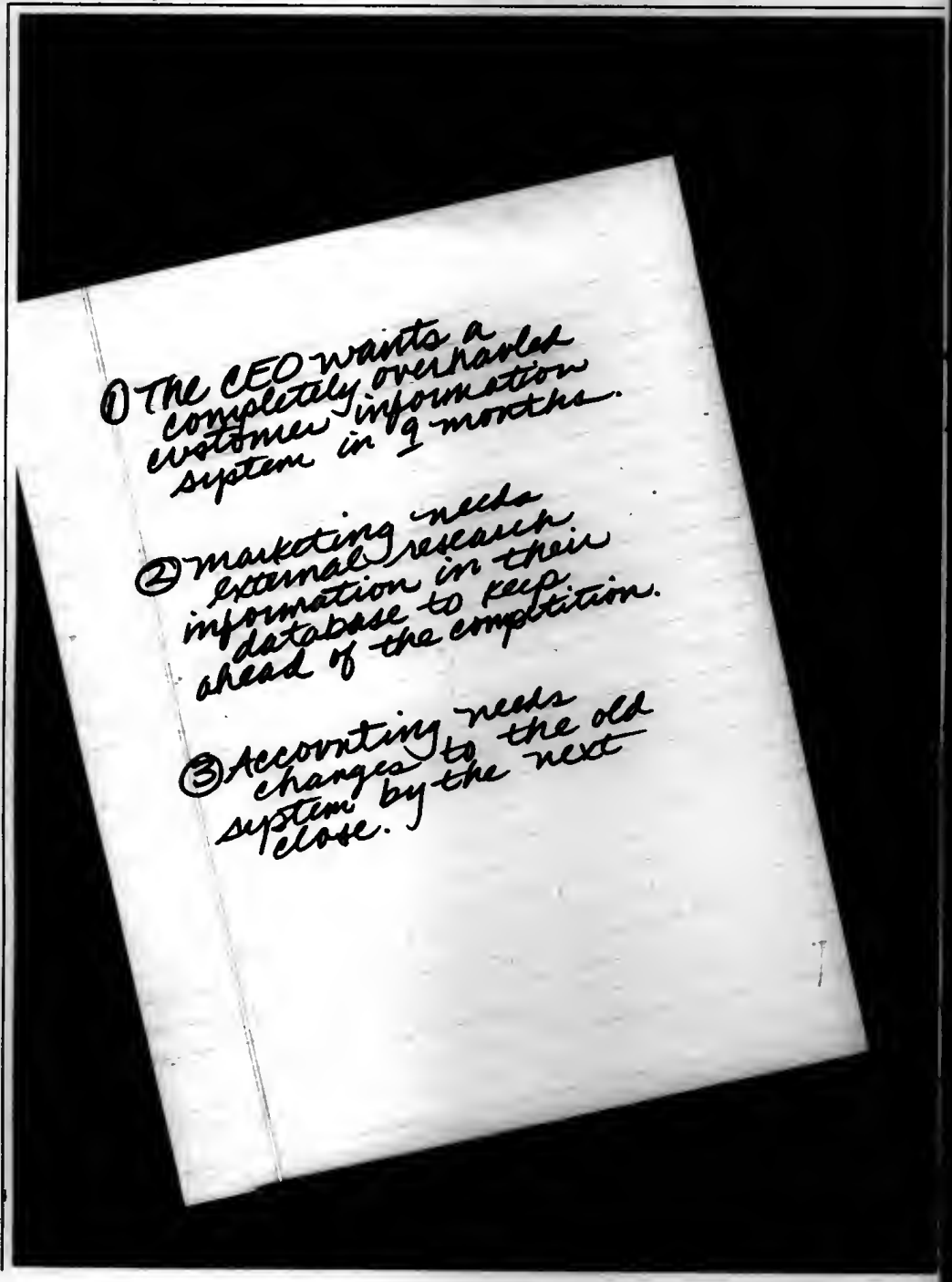
FROM PAGE 31

uncompiled applications, and most statements can execute 10 to 15 times compared with the interpreted mode of the regular R:Base line.

Microrim also took the opportunity to extend the R:Base language. Part of the enhancements involved simply removing limits on the number of conditions in If statements, Where clauses and While and If nesting.

In addition, application developers can write subroutines, procedures and functions that can accept parameters and return values.

Microrim will also provide a debugger that works with the compiler.



NEW PRODUCTS

Systems

Fortron Corp. has expanded its product line with the addition of two 20-MHz Intel Corp. 80386 systems. Both computers have sockets for either the Intel 80287 or 80387 math coprocessor. The Fortron 386-20 was designed for single-user applications and is delivered with 1M byte of 80-nsec static column random-access memory, the vendor said.

Also included are a 40M-byte hard disk, a 1.2M-byte floppy drive, one parallel port, two serial ports and an IBM Enhanced Graphics Adapter monitor and card. The Fortron 386-20 costs $3,500.

The Fortran 386-20 Plus is said to be targeted at server applications in multiuser systems and is delivered with 1M byte of 100-nsec dynamic RAM and 64K bytes of 25-nsec cache RAM. It includes the same storage and graphics configurations as the 386-20. The Fortran 386-20 Plus costs $3,950.

Both systems are compatible with IBM's OS/2.

The company also announced a 16-MHz Intel 80286-based personal computer reportedly compatible with all Microsoft Corp. MS-DOS and IBM PC-DOS software.

Called the 286-16, the PC is keyboard-switchable for operation at 8, 10, 12 or 16 MHz. The system also includes two serial ports, one parallel port and an on-board floppy disk controller for 360K-, 720K-, 1.2M- and 1.44M-byte drives. The basic 286-16 system, with 1M byte of RAM, costs $1,995.

Fortron, Suite F, 2380 Qume Drive, San Jose, Calif. 95131. 800-821-9771.

1-800-458-8851

FOUNDATION

Software applications packages

Information Technology Laboratory, Inc. has announced its first IBM-compatible Japanese-language word processing software.

Called EW Plus, the program requires no additional hardware and can be run with IBM Personal Computer ATs and compatibles, all IBM Personal System/2 models and Toshiba Corp. T3100 laptop computers. Document size is unlimited, and ASCII file formats can be used to merge other software programs into EW Plus. Character conversion is done on a word-by-word basis or by phrase.

EW Plus costs $850 per set.

Information Technology, 4th Floor, 280 Park Ave., New York, N.Y. 10017. 212-557-0177.

A data base management program for the Apple Computer, Inc. Macintosh series of computers has been introduced by Fox Software, Inc.

Foxbase Plus/Mac includes language extensions to allow programmers to customize their applications. Commands to control large display screens and full color on the Mac II are also provided, and the software is compatible with Ashton-Tate Corp.'s Dbase III Plus.

The package runs on Macintosh Plus, Mac SE and Mac II computers with a minimum of 1M-byte of random-access memory.

Fox, 118 W. South Boundary, Perrysburg, Ohio 43551. 419-874-0162.

A text retrieval system that reportedly supports up to 7,500 files and 30 million characters has been announced by Group L Corp.

Memory Lane 2.0 runs on IBM Personal Computers and compatibles with Microsoft Corp. MS-DOS or IBM PC-DOS and performs word, phrase and proximity searching, with or without indexing. The system tracks dynamic file activity automatically. A hard disk and 90K bytes of random-access memory are required.

Memory Lane 2.0 costs $149.

Group L, 481 Carlisle Drive, Herndon, Va. 22070. 703-471-0030.

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- By offering the opportunity to reduce costs by eliminating redundant hardware. *Safe sharing of resources between images or* CPUs *means that you can operate more effectively with less hardware.*

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*SIS (Single Image Software) and SDM (Shared Device Management) are two Duquesne Systems products combined and enhanced to form one new superset product, Multi-image Manager

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"We've built a unique monitoring system [illegible] PC-based and set up so that Monitor [illegible] automatically executed to identify poor [illegible] This lets me spend more time with features such as the storage display. Now when a problem [illegible] in CICS, I can alter storage or delete ICE/AID [illegible] rather than shutting down and cold starting the system."

The Monitor is the complete CICS [illegible] agement system that'll help you [illegible] the hero in your CICS community! [illegible] The [illegible]

NETWORKING

DATA STREAM

Jeffrey M. Kaplan

Who's helping whom?

Network management is the current hot button in the communications industry. It's been the unofficial theme of every major related trade show so far this year — Comnet, Interface '88 and ICA.

Yet for all the attention paid network management, how close have users really come to effective network management? And how far are vendors likely to go in order to provide the tools users need to get the job done?

Network management is one of those terms that can relate to everything from upfront network design and planning to network diagnostics and restoral. It can mean relatively simple station message detail recorder and call accounting, or sophisticated IBM Netview-compatible architectures.

Actually, all of these functions are a part of network management. Managing a network entails a number of tasks and requires a variety of tools to ensure the proper flow of information throughout an organization.

Network management has become the focus of the information-processing industry because of the push/pull of user and vendor forces. On the user side, organizations have recognized the strategic importance of information and the value of their

Continued on page 51

REPORTER'S NOTEBOOK

Vendor investments hit jackpot at network show

Participating vendors, users and sponsors invested an estimated $50 million to $60 million in the Enterprise Networking Event (ENE), held in Baltimore two weeks ago. The results pleased the Society of Manufacturing Engineers and the MAP/TOP Users Group no end.

It's really real. The message is it's real, it's happening today and it's solving real live applications in customer environments, Digital Equipment Corp. spokesman Lee Sutan said. Daniel Kosmalski, manager of computer-integrated manufacturing at Merit Systems, Inc. in Troy, Mich., added, "Where else [could] you buy a product that [had] been interoperability-tested by 58 vendors?"

Not to be a downer, but. "Anyone who thinks they can walk in [here] and buy a [MAP] system and not need the capability or knowledge of communications" is not being realistic, General Motors Corp.'s Manufacturing Automation Protocol (MAP) guru Mike Kaminsky said. "Users have to get involved with their systems."

We are the network. Participating vendors and ENE sponsors marveled often at the level of cooperation between those involved in the huge, nine-booth demo of interoperability. A Xerox Corp. spokesman recalled how one technician asked another if he could test his system. When asked who he was with, the man smoothly blurted, "Wang — no, I mean DEC."

Fading slowly; definitely not forgotten. Transmission Con-

Continued on page 50

OSI tools flood ENE

FTAM, MMS implementations at forefront

BY PATRICIA KEEFE
CW STAFF

BALTIMORE — While short on ready-to-ship products, the Enterprise Networking Event (ENE) featured a plethora of product announcements.

The nine-booth demonstration featured 23 suppliers showing Manufacturing Automation Protocol (MAP) systems, 21 suppliers featuring Technical and Office Protocol (TOP) products and another 12 exhibiting other Open Systems Interconnect (OSI) offerings.

In all, 17 suppliers exhibited implementations of both the File Transfer Access and Management (FTAM) and Manufacturing Messaging Service (MMS) protocols, 15 vendors demonstrated Message Handling Service (MHS) capabilities and eight showcased router and bridge products.

Among the products exhibited were the following:

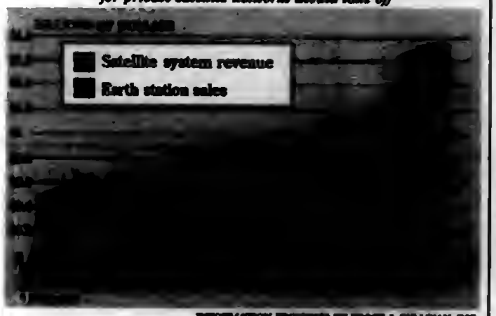
- Motorola Microcomputer Division in Tempe, Ariz., unveiled Micromap 3.0, an implementation of the MAP 3.0 specification for the vendor's MVME372 and MVME372A Advanced MAP network adapter; Microtop 3.0, an implementation of the TOP 3.0 specification for the MVME374 Ethernet Controller board; and Minimap 3.0, a three-layer collapsed architecture of the MAP 3.0 spec optimized for real-time applications. Motorola also added MAP, TOP, Minimap and X.25 capabilities to its 68030-based VME Data Series system platforms.
- Siemens Corp. in Peabody, Mass., said it will offer a MAP 3.0 communications interface that will enable users to link its line of Simatic programmable controllers directly to a MAP 3.0 carrierband network. It is set to be out in first-quarter 1989.

Continued on page 51

Data View

Satellite nets scope out stellar future

As businesses seek cost-effective transmission methods, the market for private satellite networks should take off



INFORMATION PROVIDED BY FROST & SULLIVAN, INC.
CW CHART

Micom bares OSI, OS/2 net strategies

BY PATRICIA KEEFE
CW STAFF

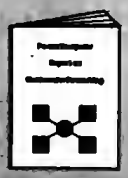
BOXBORO, Mass. — Micom-Interlan, Inc. has introduced a battery of products said to offer a choice of either Open Systems Interconnect (OSI) or Transmission Control Protocol/Internet Protocol (TCP/IP) with an IBM Nethios interface.

Like many networking vendors today, Micom's strategy is to provide a migration path from TCP/IP to OSI. The firm predicted that OSI will hit critical mass in about two years. The primary motivators behind the push are the U.S. government and the European community. Also, U.S. firms that must communicate with overseas offices and customers will need OSI.

Micom will create an OSI foundation using subset access building blocks while supporting current applications through Nethios. Higher level OSI ser-

Continued on page 49

Advice on Integrating IBM, DEC, HP, & Unisys Networks



Forest Computer Report on Multivendor Networking

This report published by Forest Computer discusses networking solutions for multiple vendor environments. In it you will learn about:

- Strategic reasons for developing a multivendor network.
- Methods for using a multivendor network to reduce networking and computer costs.
- Each vendor's network architecture and connectivity solutions.
- Total solutions for developing a multivendor network.

In addition, the report contains a 200 word glossary of IBM, DEC, Hewlett-Packard, and Unisys networking terms.

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Forest Computer designs, develops, markets, and supports multivendor networking solutions for organizations with IBM, DEC, Hewlett-Packard, and Unisys networks. Its seven years of experience in providing major corporations with superior networking solutions contributed to the development of this report.

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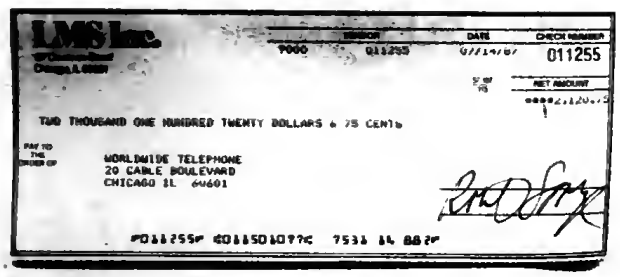
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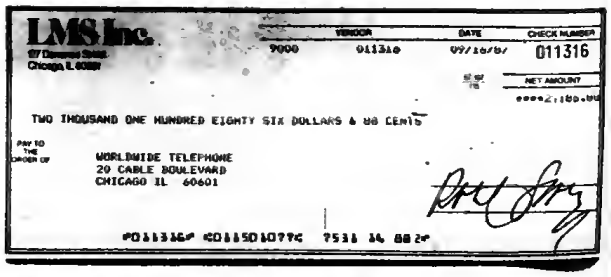
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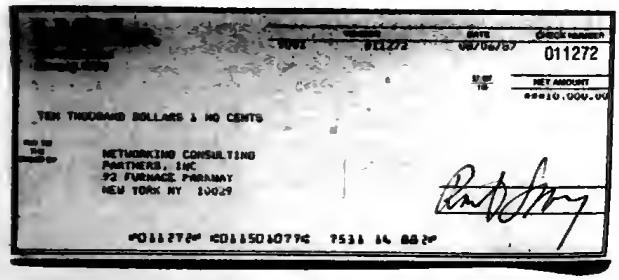
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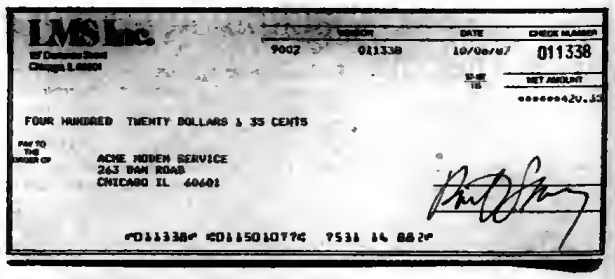
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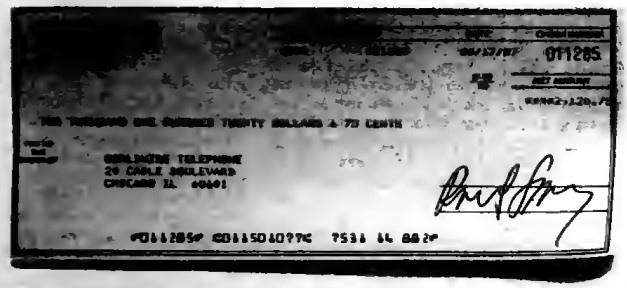
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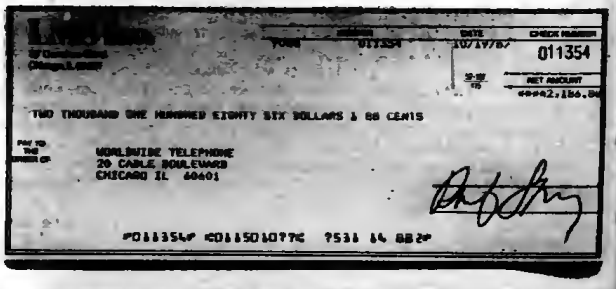
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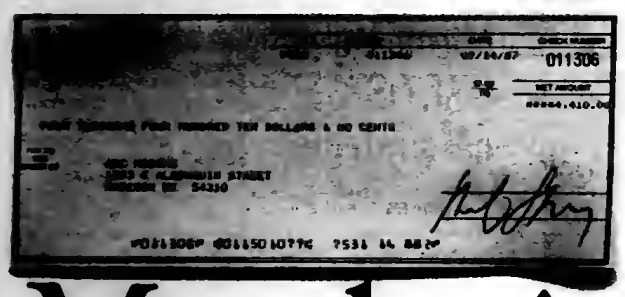
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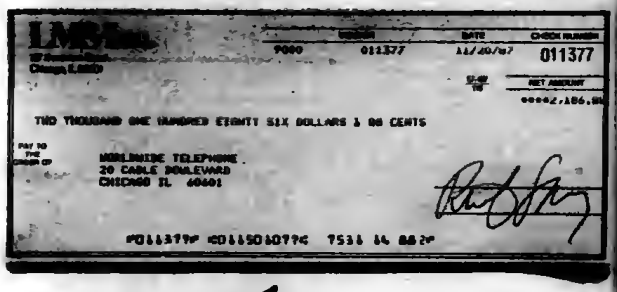
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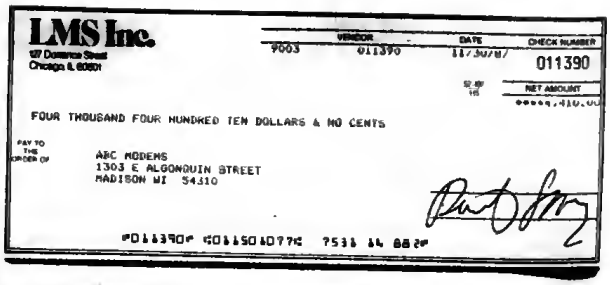

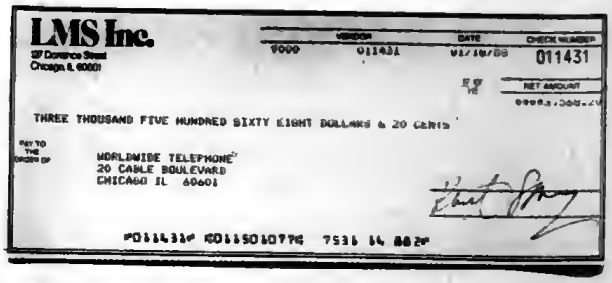

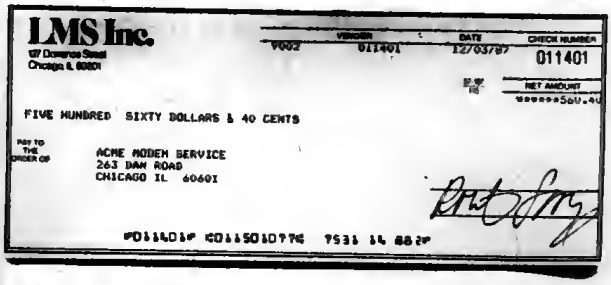

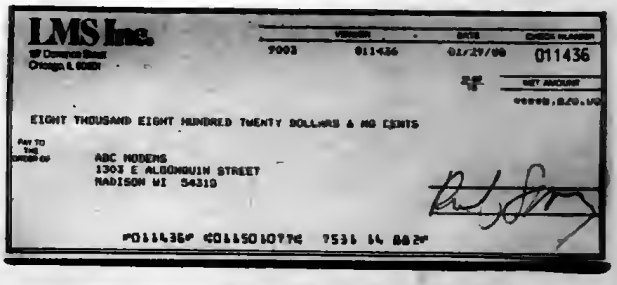

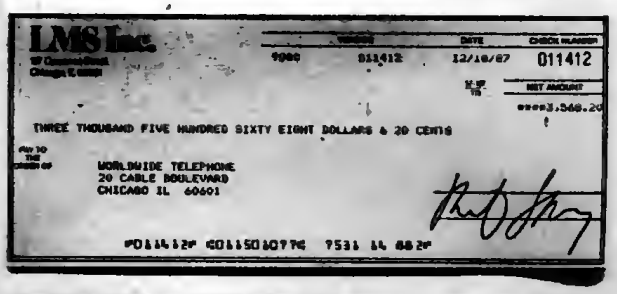

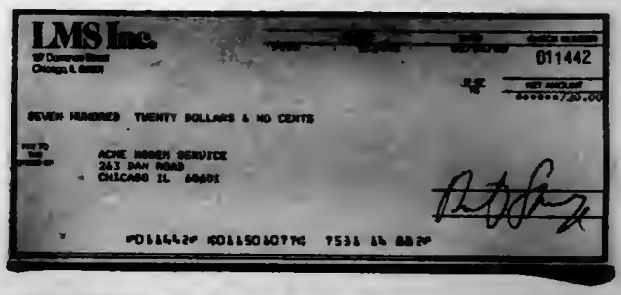

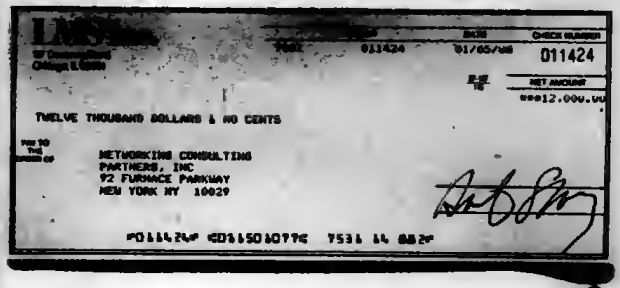

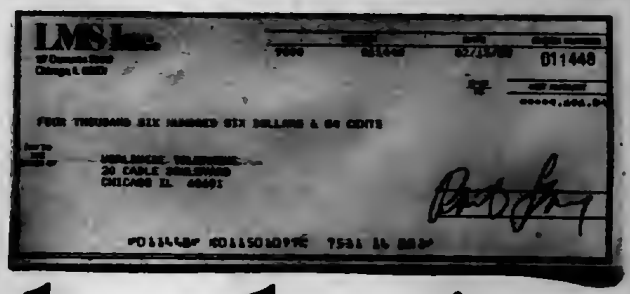

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Ungermann-Bass talks OSI

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc., a subsidiary of Tandem Computers, Inc., has announced plans to support Versions 3.0 of Manufacturing Automation Protocol and Technical Office Protocol (TOP) as well as domestic and some international versions of the Government Open Systems Interconnect Profile.

The company will continue to market and support products based on the Transmission Control Protocol/Internet Protocol (TCP/IP) and Xerox Network Services (XNS).

Despite the hoopla surrounding user intentions to migrate to Open Systems Interconnect (OSI), users are not beating down the door for related products, said Paul DePond, Ungermann-Bass's director of system software marketing.

The overwhelming majority of Ungermann-Bass's new orders are TCP/IP-based, and 90% of its installed base is XNS, DePond said.

"But Fortune 500 companies are looking for a [local-area network] vendor to partner with for the long term," he commented.

So as demand increases for OSI products, Ungermann-Bass said, the firm will provide a migration path between the old and the new via "value-added extensions" in the form of both user and programmable interfaces.

OSI will be implemented through Net/One OSI, a repackaged and enhanced version of the former Industrial Networking, Inc.'s product line. Absorbed into Ungermann-Bass in November 1987, Industrial Networking produced MAP 2.0 and 2.1 products.

'New and improved'

"They are basically putting a 'new and improved' label on the [Industrial Networking] line while adding 3.0, increasing memory and optimizing the software," said Bruce Richardson, an analyst with Advanced Manufacturing Research (AMR) in Salem, Mass.

"[Ungermann-Bass'] current strategy is a sound response to user networking demands — support of the OSI protocol stack (including MAP application protocols) for all [IEEE] 802 LAN-access methods," according to the May issue of "The AMR Report."

Net/One OSI ultimately will include interfaces for Ungermann-Bass' Map/One OSI for Token Bus; Net/One XNS for Carrier Sense Multiple Access/Collision Detection (CSMA/CD) and IBM's Token-Ring network; Net/One TCP, TCP/IP for CSMA/CD and Token-Ring network; and X.25 products.

By year's end, Ungermann-Bass said it will release three Early Start development kits offering the full MAP 3.0 protocol stack (board resident) and Manufacturing Messaging Service (MMS) software.

Micom

CONTINUED FROM PAGE 45

vices will be added as needed, such as File Transfer and Access Management (FTAM), CCITT X.400 and Virtual Terminal Protocol (VTP). TCP/IP will be available on the same system.

During a four-phase rollout, users will be provided with a choice of network protocols, hardware environments, physical media and network services.

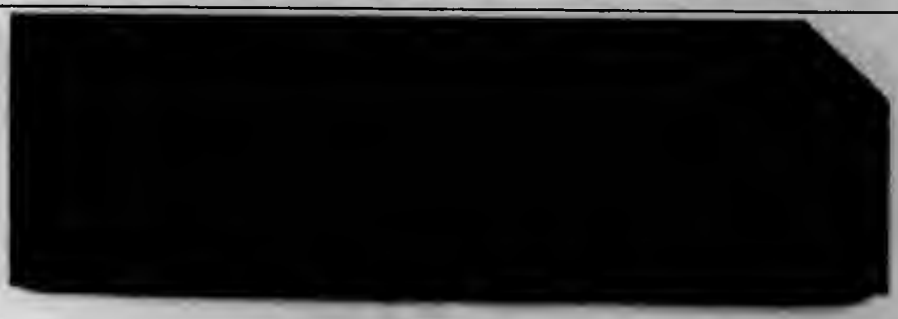
In a flurry of product and strategy announcements, the following were unveiled:

- OSI for Microsoft Corp.'s OS/2 LAN Manager. The NP638 is a turnkey controller using the first four layers of the OSI model, a Nethios interface and Micom's protocol processor board. Featuring an Intel Corp. 82586 coprocessor and a choice of thick or thin Ethernet or unshielded twisted-pair cable, it costs $995.

Micom-Interlan currently resells Novell, Inc.'s Netware and said that Netware and the LAN Manager will coexist in much the same fashion as TCP/IP and OSI. However, it appears that the LAN Manager will be Micom's choice for OS/2 networking.

- A series of six protocol processors and data link controllers supporting Nethios for DOS environments. Users have a choice of either the personal computer bus or IBM's Micro Channel bus architectures, board- or host-based processing and TCP/IP or OSI protocols. The products are used in workstations and servers running applications under either Microsoft's MS-Net or IBM's PC-Net. Pricing ranges from $725 to $1,295.
- OSI networking for DOS, Unix and OS/2 featuring carrier-sense multiple access with collision detection subnetwork access. In the next 12 months, the following access and services will be provided, according to Micom-Interlan: FTAM and X.400 by October; VTP in two phases in November and February; directory services and Manufacturing Automation Protocol 3.0 network management functionality in February; IBM Token-Ring subnet access in November; and FTAM command line interface in December.

The trend in workstations is toward Unix, said Bruce MacAloney, director of product marketing. "We can give them TCP/IP, OSI and Decnet," he said.



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Investments

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trol Protocol/Internet Protocol (TCP/IP) and, more specifically, TCP/IP-to-Open Systems Interconnect (OSI) migration, was the topic of many conversations at ENE. Maybe it's not the wave of the future, but it is a critical factor influencing the stroll toward OSI today. Ungermann-Bass, Inc., for example, reported that 80% of its new business is TCP/IP-based. Estimated time period before OSI eclipses TCP/IP? Five to 10 years.

True colors. Despite rumors to the contrary, IBM announced nothing. It did have a booth, featuring an incredibly loud Token-Ring demo, a Systems Network Architecture (SNA)-to-OSI bridge via Token-Ring and a huge chart detailing IBM's OSI product strategy. But missing was one key piece of information: IBM's OSI scenarios and products are only available in Europe and Canada. You had to ask to find out.

But take heart. Ellen Hancock, president of IBM's Communications Products Division, reportedly dropped in on the show for a day. She told analysts earlier this year that her division would be researching SNA-to-OSI links.

Under the cost iceberg. According to Ungermann-Bass, Aluminum Company of America, or Alcoa, which has already launched one MAP 2.1 installation, has decided to go with MAP 3.0 in its remaining two plants. Alcoa plans to scrap its MAP 2.1 investment, having determined from a maintenance and support standpoint that it is more cost-effective — if not easier — to support one version of MAP.

It's COSt a lot. It would seem that 3Com Corp. either likes the Corporation for Open Systems (COS) a lot or just likes to do things in threes. Actually, 3Com's penchant for joining COS — you guessed it, three times to date — is tied into a tangle of attempted and actual mergers, according to 3Com founder and COS Chairman Robert Metcalfe.

3Com first sent a check for $125,000 to COS on behalf of Convergent Technologies, Inc. when the two were walking down the aisle. After that merger was tripped up at the altar, 3Com sent COS another $50,000 to cover a 3Com membership.

More recently, 3Com cinched the knot with Bridge Communications, Inc., triggering another $200,000 check that added Bridge to the COS roster. That $400,000 total is a "substantial fraction of our profits," noted Metcalfe, adding that 3Com has paid as much in membership fees as has significantly bigger competitor IBM.

Mr. Smith joins COS. On the surface, Metcalfe may look like an odd choice to head up COS. The principal inventor of Ethernet, he has been a vocal critic of the MAP standard's dependency on broadband media — "bad judgment" — and its use of token-bus technology. The decision to not provide 2.1 compatibility with Map 3.0 was a "major botch for MAP," Metcalfe claimed. Will he temper those comments now that he is COS chairman? No, but few seemed to mind. A number of COS members echoed Xerox's support for Metcalfe as a trusted man with a lot of integrity.

Multilingual support. Doubt no more that OSI is big overseas. One-third of the nearly 10,000 attendees came from the international sector, according to the SME. In 1992, the European community will require OSI: By law, if you want to do business, you'll have to have it.

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Mac3270 features a powerful, 150-command script language so programmers can easily automate all user functions such as Mac access to host applications. In addition, users can take full advantage of the Mac's friendly interface for straightforward connection to mainframe, midrange and microcomputers.

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E-mail links to SNA systems

TORONTO — An electronic mail package built directly onto IBM's Systems Network Architecture Distribution Services (SNADS) that reportedly can be linked to IBM mainframes without proprietary hardware or software has been unveiled by Emissary Systems Ltd.

Herald Mail reportedly gives users of IBM and Microsoft Corp. DOS and OS/2-based local-area networks the ability to exchange documents and messages with users of IBM's Distributed Office Support System (Disoss) and other office systems based on IBM's SNA. No additional mainframe or minicomputer software is needed to establish the link.

Herald is identified as another SNADS node, enabling personal computer users on a LAN, or on several LANs, to be integrated with host Disoss users and vice versa, according to Emissary Vice-President Gregory Sokoloff.

The system is made up of three components: the Herald Mail Application, a standard file server and the Herald Mail Server, which is a dedicated micro running either DOS or OS/2 that operates as a SNADS node using a standard IBM Synchronous Data Link Control communications card.

The package uses a Lotus Development Corp. 1-2-3-style interface said to allow users to select network addresses from a Mail Directory, which shows both individual users and distribution lists.

The DOS version of Herald Mail is available at $6,995 for any number of users on a single LAN. An OS/2 version is set to be released in the third quarter.

Kaplan

CONTINUED FROM PAGE 45

networks as corporate assets. On the vendor side, manufacturers have identified network management equipment as a weapon in their product portfolios.

But as the network management market heats up, these capabilities are becoming less of a differentiating feature for vendors and more of a minimum requirement. Users have made network management a prerequisite for consideration in almost every request for proposals. And vendors must offer network management systems to keep the installed base from turning to alternate suppliers.

Many vendors admit to uncertainty about the potential profits in network management. They have been pulled reluctantly into battle by users demanding added tools to help them operate their networks. Yet users surveyed by The Ledgeway Group are undecided about which network management functions are worth paying extra for.

A number of vendors have introduced network design and planning systems during the last three months. BBN Communications, Network Equipment Technologies and Timeplex have unveiled systems that reportedly will help their customers configure networks and estimate costs.

These systems go a long way toward addressing problems. However, none go far enough. First of all, none are available as marketable products. Instead, they are positioned as network support tools operated by the vendor to remotely assist users in designing networks. One reason for this is that vendors are unsure whether users will spend money for these devices. But as they are currently packaged, it is unlikely that users would be willing to shell out hard cash.

Second, all are proprietary systems. Users see right through this inherent weakness and question the true value of these systems. They want to look at all their options, not just one vendor's approach, as they determine how to grow their networks.

These are examples of what's wrong with the network management market. The users we talk to are thirsty for the kinds of network management features being offered today, minus the product bias. So vendors are caught in a dilemma. They are hesitant to offer tools that enable users to view all of their options because they're afraid of providing the ammunition to go elsewhere.

As a result, vendors are really using network management as a way to control their customers, rather than to help customers control their networks. And the latest round of network design systems appear to be designed to help vendors sell more equipment rather than to help users design better networks.

Kaplan is director of Network and Professional Services at The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

OSI tools

CONTINUED FROM PAGE 45

GE Fanuc Automation North America, Inc. in Schenectady, N.Y., introduced a MAP 3.0 card set for its Series Six programmable controller. The same hardware reportedly will be able to accommodate seven-layer MAP 3.0 software when it becomes available later this year.

- Burr-Brown in Tucson, Ariz., demonstrated a MAP 3.0 data collection factory network server said to provide distributed access to and control of a variety of the vendor's factory data collection devices. Available now, it supports up to 64 Burr-Brown compact microterminals and features MMS applications interface software, OSI connectivity and both carrierband and broadband interfaces.

Among the vendors demonstrating previously announced X.400 capabilities were NCR Corp., Digital Equipment Corp. and Xerox Corp.

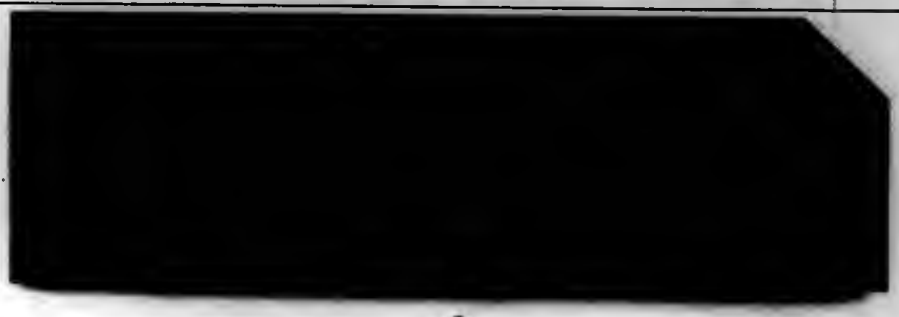
- Softswitch, Inc. in Wayne, Pa., unveiled Gateway/X.400, which reportedly links electronic mail networks implementing IBM's Systems Network Architecture Distribution Services protocol to X.400-compliant MHS and to all Softswitch-supported systems. The product is scheduled to be available in the fourth quarter.
- Telenet Communications Corp. in Reston, Va., announced the availability of an X.400 E-mail network for aerospace and related government agencies.

Government Open Systems Interconnect Profile (GOSIP) products were also in force at the show. One of the major booths was the U.S. Air Force's Aerospace Manufacturing Laboratory, which joined with contractors to demonstrate how MAP/TOP can be used to exchange product data among design, manufacturing and publishing systems.

Small OSI technology vendors such as Retix Corp. in Santa Monica, Calif., and Netwise, Inc. in Boulder, Colo., said they plan to tap the federal market by working with systems integrators. Netwise, for example, expanded its line of code generation tools to include support for OSI distributed applications. Also, the OSI version of RPC Tools is intended to help applications developers migrate software from TCP/IP to OSI and GOSIP networks without changing the original application code, Netwise said.

The product costs $1,750 in a microcomputer version, $27,000 in a minicomputer version and $64,800 in a supercomputer version.

Washington correspondent Mitch Betts contributed to this report.



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NEW PRODUCTS

Local-area network hardware

Local Data, Inc., has announced a series of multiple access units (MAU) that reportedly allow users to connect terminals and personal computers to the IBM Token-Ring.

The units are available in two types: the **Active MAU Series 8220** and the **Regenerative MAU Series 8228**, which are four- and eight-port models, respectively. Both provide distances of up to 500 ft between MAUs and 300 ft between a MAU and a personal computer.

Pass-through and looping capabilities are also provided. The models are said to be fully compatible with the IBM 8228 MAU.

The Active MAU series costs from $395 to $595, and the Regenerative MAU series costs from $595 to $795.

Local Data, 2771 Plaza Del Amo, Torrance, Calif. 90503. 213-320-7126.

Micom Systems, Inc. has added a local-area network bridge expansion to its Digital Wideband Exchange T1 products.

The DX-LBE permits Micom T1 networks to support voice, data, video and LAN communications within a single network environment.

In addition to providing LAN bridging for Ethernet 802.3 LANs within the Digital Wideband Exchange T1 network, the product extends network management reporting and control to each interfaced LAN. The network manager reportedly can tune each bridge circuit according to the individual needs of LAN users.

The DX-LBE costs $6,975.

Micom, 4100 Los Angeles Ave., Simi Valley, Calif. 93062. 805-583-8600.

A single-circuit board that reportedly reduces the costs of distributed network management services has been announced by **Hughes Network Systems, Inc.**, a subsidiary of Hughes Aircraft Co.

The vendor claimed that the **Mini Auxiliary Service Processor (MASP)** lowers the distributed network services costs of Hughes' Integrated Packet Network from $25,000 to $10,000 per MASP-equipped packet exchange. According to Hughes, the product is ideally suited to wide-area network topologies with packet exchanges far removed from the Network Control Processor, such as private multinational corporate networks.

Hughes Network Systems, 11717 Exploration Lane, Germantown, Md. 20874. 301-428-5887.

Local-area network software

Network Research Corp. has added a number of features and performance enhancements to its **Fusion Network Software Version 3.2** for Microsoft Corp. MS-DOS systems.

The latest release will be included in Fusion And, a new package with bundled Fusion software and Western Digital Corp.'s Ethercard Plus LAN Adapter. Version 3.2 will also be available separately for other network controller support.

Enhancements reportedly include a simplified installation procedure, subnetting, Digital Equipment Corp. VT100 terminal emulation and program development support for Microsoft's C Compiler Version 5.0.

Fusion Network Software 3.2 for MS-DOS costs $300.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030. 805-485-2700.

General Computer Corp. is now shipping **PLP Share**, an Apple Computer, Inc. Appletalk networking adapter for the Personal Laserprinter and the Personal Laserprinter Plus.

PLP Share is said to allow all Apple Macintosh users on an Appletalk network to access the output devices. The product is available in 75, 150 and 300 dot/in. draft modes. The software includes a spooler that transmits image documentation in background, allowing the user to continue working on the Macintosh while a document is printing.

PLP Share costs $999 and includes all fonts available for the Personal Laserprinter.

General Computer, 580 Winter St., Waltham, Mass. 02154. 617-890-0880.

Computer Associates International, Inc. has released **Accpac BPI Accounting Lanpak**, a program that provides for accounting system growth by allowing multiple users to share accounting resources, the vendor said.

The system was designed for small to medium-size businesses with general accounting needs. Up to eight users can use the software modules and data simultaneously. Users can reportedly access, edit or view account, customer or vendor information simultaneously as well as share printers and storage devices.

The system runs on Novell, Inc.'s Advanced Netware and Novell ELS, 3Com Corp.'s 3+ and IBM Personal Computer local-area networks.

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INSIDE

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Organizations can envision uses for LU6.2, but few are ready to move ahead without a commercial base

CROWD AWAITS ALL CLEAR ON LU6.2

BY MICHAEL HURWICZ

CHRIS DEMAREST

LU6.2, IBM's program-to-program SNA protocol, is still an item on many organizations' "to do tomorrow" lists, even in those that seem like ideal candidates for its deployment.

Arco Products Co. in Los Angeles is a case in point. It will probably be at least a year before the company, the petroleum refining and marketing unit of Atlantic Richfield Co., gets around to implementing the protocol, even though it fits the LU6.2 profile perfectly.

LU6.2 is intended to provide a common connectivity scheme for dissimilar systems such as microcomputers, local-area networks, minicomputers and mainframes. With more than a half-dozen IBM Token-Ring networks supporting some 250 workstations, five IBM mainframes and more than 3,000 terminals or IBM Personal Computers emulating IBM terminals, Arco has plenty of dissimilar systems.

Because LU6.2 is IBM's strategic protocol for integrating intelligent processors on Systems Network Architecture (SNA) networks, it is particularly attractive to companies committed to IBM and SNA. Given its predominant reliance on IBM and SNA, Arco falls into that category.

Arco is interested in LU6.2, explains Chris Broome, a senior technical consultant at the firm, but, like many other companies, Arco is deferring action until more application software emerges.

"We would like to do something more than just plain terminal emulation or file transfer," Broome says. "For example, we would be very interested in having a PC user be able to formulate a query and receive an answer from the mainframe without having to go through the multistep process of terminal emulation, downloading data to the PC and using a PC software package to analyze that data."

However, Broome adds, "We are not in the business of writing application programs, so one thing we are looking for is delivery of products such as intelligent data base managers on the PC that take advantage of LU6.2."

Even when those applications are available, Broome says, adoption will take time. "One question is when the facility will be delivered by the vendors in an acceptable form. Another is how long it will take us to start using it. After you take something out of the wrapper, it takes quite a while to get used to it. I doubt that LU6.2 will be seriously integrated into our system within the next 12 months."

One of the national television broadcasting companies is also evaluating LU6.2. But the protocol is regarded only as a "long-range possibility." It may be something the company will get to next year, its telecommunications manager says, "depending on what demands arise for PC communications."

Currently, the broadcasting company's efforts are concentrated on managing the rapid growth of its network. This network connects 1,200 terminals or PCs emulating terminals scattered throughout several states to two 3090 mainframes via SNA. In addition, several departments have installed or are installing IBM System/36 and 38 minicomputers. While it uses a variety of micro-to-mainframe products from Novell, Inc.,

Hurwicz is president of The MTI Group, a data communications consulting firm in Nashville.

LU6.2

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the company is definitely a committed SNA shop.

The telecommunications manager says he may be able to turn his attention to higher level protocols such as LU6.2 when network expansion slows. He maintains such higher level protocols would be helpful in situations in which information under the control of one application needs to be included in a report or screen of another.

That time may come within the next year, the manager predicts, hastened by the growing number of departmental System/36s and 38s.

Because they can support PU2.1, the minicomputers will be able to run multiple LU6.2 sessions simultaneously and set up sessions without the mediation of a host. This, he says, makes the systems appropriate central management points for clusters of intelligent nodes.

Using minis in that manner is still just a possibility, though. The broadcast company currently operates a hierarchical, terminal-to-host network.

Despite a seemingly fertile field for LU6.2, it appears it will be some time before the protocol is solidly implanted in corporate data processing application environments.

"Adoption of LU6.2 will be extremely slow, extremely limited," says Lee Doyle, senior PC analyst at International Data Corp. (IDC) in Framingham, Mass. "There are a number of well-publicized cases where companies are actually writing applications for LU6.2. Their numbers are increasing, but they are on the 'bleeding edge' of the technology."

Applications on the edge

An example of an early LU6.2 implementation, started as a pilot project in 1984, is the network that supports the Apollo airline reservation system operated by the Covia Partnership.

The network, which made headlines in May when four European airlines bought more than 38% of it from United Airlines, is devoted to the Apollo system, the second largest airline reservation system in the world.

The Covia system has grown rapidly since 1983, when it carried 400 messages per second, to today's level of 1,100 messages per second. The system is expected to continue to grow at 100% per decade, according to Mark Teflian, vice-president of technical planning and systems engineering for the partnership.

That 100% growth in traffic will be accompanied by a 1,000% growth in the complexity of applications. Simply quoting the lowest fare is complicated, Teflian says.

Answering queries that do not ask for the lowest fare only or that integrate schedules and fares, such as "Show me all flights for tomorrow that cost less than $200," is still more complex. To support this complexity, United Airlines decided to use LU6.2.

Three varieties of LU6.2 were required. One variety is implemented on a 4381 mainframe running IBM MVS/CICS and building passenger name records. Other reservation functions are implemented on IBM mainframes running IBM's Transaction Processing Facility (TPF). These two implementations make up the central reservation data base located in Denver.

> "ADOPTION of LU6.2 will be extremely slow, extremely limited."
>
> LEE DOYLE
> INTERNATIONAL DATA CORP.

On the microcomputer side, the system uses the Token-Ring network hardware and LU6.2 software from Communications Solutions, Inc. in San Jose, Calif. United Airlines and Covia tailored Communications Solutions' code to work with Covia's proprietary software.

After the pilot project in 1985, migration to LU6.2 as a global session-level interface began in 1986 and should be completed within three to five years.

"The migration is well under way," Teflian says. "We will fulfill our long-range business automation and capacity requirements through the early 1990s by distributing transaction processing using LU6.2. We see LU6.2 as the best session-level platform for connectivity."

BOA's Kimball

However, he explains, applications on the network do not use the LU6.2 interface directly.

Indirect service

Instead, proprietary software, the Covia Open Systems Manager, provides services to applications, while protocols such as IBM's Netbios provide session- and datagram-level LAN interfaces. LU6.2 is used only to connect LAN application nodes to wide-area network application nodes.

Covia would like to bring LU6.2 down to the LAN workstations. "We would prefer to have the same session-level interface everywhere," Teflian says, "on the local-area network and on the wide-area network."

But Covia has not yet found a way to do that while retaining reasonable price/performance and management. IBM's OS/2 may provide that, Teflian adds.

The Apollo system's current LAN-based software runs under DOS 3.3, using the IBM PC LAN Program and proprietary Covia programs.

However, Covia plans to implement Microsoft Corp.'s LAN Manager architecture, for which it is considering a number of products, such as IBM's OS/2 Extended Edition, 3Com Corp.'s 3+Open and Novell's Netware products for OS/2.

Teflian says Covia has found LU6.2 to be "very practical" and more directly applicable to transaction processing, a function for which it was designed, than other available protocols.

LU6.2 also allows Covia to completely insulate the session interface from lower layers. "The rate of change at the lower layers is so rapid, yet the migration process is so lengthy, that we have to support multiple transports, both for existing nondistributed and for new distributed applications," Teflian says.

Teflian says he also hopes LU6.2 will integrate well with the Open Systems Interconnect (OSI) session-level protocols currently under development. Ideally, he says, he would like to see OSI protocols that are "verb-to-verb semantically and functionally compatible" with LU6.2 at the session level.

Teflian says he questions whether that will happen, however. The current proposed OSI protocols are running into trouble in various committees, he says, precisely because they resemble LU6.2 too closely, and OSI developers may want to avoid using an existing de facto standard. He hopes that, at the very least, developers will come up with something functionally the same as LU6.2 so that the translation process will be relatively painless.

Another user aggressively implementing LU6.2 is Bank of America, headquartered in San Francisco.

The bank started making plans to use LU6.2 in 1984, when it set a strategic goal of unifying 66 separate networks, each with hard-wired terminals and a separate mainframe data base, into one Global Data Network.

Bank of America first decided to base its implementation plans on IBM's strategic direction, centered around LU6.2, because it operated numerous IBM mainframes, says Gregory Kimball,

Continued on page S3

SNA terms and definitions

APPC: IBM's Advanced Program-to-Program Communications, another name for LU6.2.

APPN: IBM's Advanced Peer-to-Peer Networking, a feature of its System/36 communications functions.

CPMSU: Control Point Management Services Unit, a new data type to carry network management data in IBM's Systems Network Architecture (SNA).

IBM 3720, 3725, 3745: Front-end communications processors in ascending order of size.

LEN: Low-Entry Networking, another name for direct PU2.1-to-2.1 communications.

Logical Units (LU): Entities that provide SNA access to end users and are represented by terminals and applications in an SNA network. All user logons are represented internally in SNA as LU-to-LU sessions.

Various LU types exist to accommodate different device types. LU1 and LU3 are for batch-type sessions, LU2 for interactive devices and sessions and LU6.2 for program-to-program communications.

NCP: Network Control Program, control software for IBM front-end processors.

Netview: IBM's network management software that runs in the host to provide network control center functions.

Also used as a generic prefix with network management such as Netview Performance Monitor and Netview/PC.

NMVT: Network Management Vector Transport, one of several architected record types to carry network management data in SNA.

Path Control Network: Official name for the SNA transport network defined by the lowest three layers of SNA. The transport or backbone in SNA consists of interconnected subarea nodes, hosts (VTAM) and NCPs.

The primary control header involved is the Transmission Header with format identifier FID 4 TH.

Physical Units (PU): Distributed control elements in SNA such as front-end processors and cluster controllers. The term "physical unit" does not represent a physical entity — it may be implemented in hardware, software or a combination. In SNA, all terminals must be attached to the physical units that control them.

Physical unit functions and the terminal can be within the same device. Various types of physical units are defined in SNA; the term "node type" is used synonymously with PU type.

PU5 is a part of VTAM in the host and provides central directory services and route management functions. PU4, associated with the front end and NCP, provides functions of a major network congestion, recovery and so on.

For small mainframes with no front ends, such as the IBM 4361s and 9370s, NCP or PU4 functions are provided by VTAM directly. PU4 and 5 are also referred to as the subarea nodes.

PU2 and 2.1 are associated with network stations, including dumb terminals, personal computers and minis, and provide local addressing and control for these devices. These nodes do not understand protocols used among subarea nodes and do not participate in the backbone network functions. Such nodes are also known as peripheral nodes.

RECFMS and RECMS: Record Formatted Maintenance Statistics and Record Maintenance Statistics, two of several record types to carry network management data in SNA.

Subarea nodes: Another name for PU4 and 5 host and front-end nodes that jointly form the transport in SNA.

SSCP: System Services Control Point, SNA component responsible for the overall control, management and monitoring of the network; one of the most significant elements in SNA.

SSCP resides in the Advanced Communications Function for VTAM in an IBM mainframe.

Transmission Header: Level 3 header in SNA. It carries addresses, route identification, network priority and other transport protocol flags.

VTAM: Host software that provides most significant SNA functions in the host and contains SSCP and PU5.

ATUL KAPOOR

LU6.2

FROM PRECEDING PAGE

vice-president and senior systems manager at the bank's Base Technology Operations group.

Further study revealed that TPF would provide the best base for a high-transaction-volume LU6.2 environment. Accordingly, about 2½ years ago, Bank of America entered into a joint development effort with IBM to develop LU6.2 for TPF.

The first LU6.2 transaction occurred in April 1987.

Keep it simple

LU6.2 allows programmers to modify programs more efficiently, Kimball says. "It removes the need for an application programmer to be intimately aware of underlying session control for the network."

Instead, he says, programmers use the LU6.2 verb set, which is independent of lower layers. "We don't have any very hard figures yet," Kimball adds, "but we are confident that we will realize productivity gains between 20% and 25% because of the simplified programming interface."

Bank of America is currently running three applications under LU6.2: a teller application, a customer on-line information network (COIN) application and a change management system.

The teller application allows bank personnel to use IBM Personal System/2 Model 50s on IBM Token-Ring networks to perform their duties.

Kimball says the application, which is deployed in only one branch so far, has proven worthwhile in several ways.

"First of all, we can use the emerging features of both hardware and software platforms to enhance the basic presentation without modifying the host application," Kimball explains.

Nipping errors in the bud

Network availability and response time have also improved. Kimball attributes this largely to improved network control achieved through Netview and LU6.2. Because the teller application uses LU6.2, it can easily send alerts to the mainframe through Netview. Thus, incipient problems are detected and corrected more quickly.

In addition, because the applications on both ends of the LU6.2 program-to-program conversation, known as partner programs, are designed to detect and recover from errors, fewer error-checking and recovery functions are required at the systems level. This lightens the mainframe's load considerably.

"We don't have to try to come up with one recovery method that works for every application we might have," Kimball says. "With LU6.2, the two partner transaction programs know which one is in control at any given point, and they're best suited to determine what type of error has occurred and how to recover from it."

The bank's second LU6.2 application, COIN, is used in service centers that handle customer inquiries about account balances or Bank of America products and services. There are 43 such service centers in California. Four have been converted to LU6.2, with the remainder scheduled for migration by the end of the year, according to Kimball.

The bank's change management system uses LU6.2 to manage alterations in the network, particularly in network applications.

> "WE LOOK FORWARD to the day when all the back-end processors will speak LU6.2."
>
> GREGORY KIMBALL
> BANK OF AMERICA

The system was necessitated by the introduction of intelligent workstations running applications. "Change management within just a host mainframe environment has always been a complicated process that required an exorbitant amount of control and synchronization," Kimball notes. "Instead of four or five mainframes, we now had to exercise that control over more than 22,000 micros in 1,200 different locations."

The basic plan for the application is to send changes from the mainframe to a single node — called the software distribution node — on each Token-Ring network.

When changes arrive, software indicators are set. PCs on the LAN check those indicators and recognize the need to load the new software. LU6.2 transports information from the mainframe to the software distribution node and also provides communications between nodes on the LAN.

In general, the bank is extremely happy with LU6.2 so far, Kimball says. The thorniest problems involve timing.

Kimball says it is difficult from a management perspective to time implementations of particular functions to coincide with the availability of the technology to handle those functions.

For example, Bank of America currently runs LU6.2 under TPF and CICS and has to go through protocol conversion

Continued on page S5

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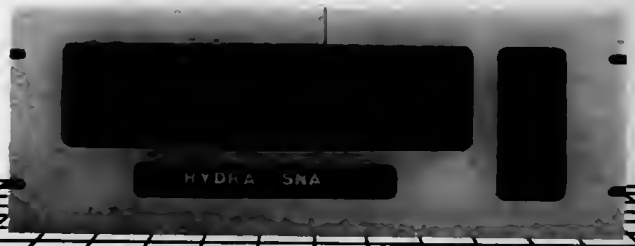

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Life on the SNA fast track

BY ATUL KAPOOR

After starting as a primitive single-host architecture, IBM's Systems Network Architecture (SNA) has established itself as the most widely used architecture for private data networks. Lately, it has also entered the shared public network arena.

While SNA's success is indisputable, both IBM and its network architecture now face significant challenges. One is to convince customers to continue using a vendor proprietary architecture, even as domestic interest in international standards is rising and Open Systems Interconnect (OSI) and CCITT's X.25-compatible products are emerging from major vendors such as AT&T and Digital Equipment Corp.

IBM is emphatic about its intent to support international standards as each becomes extensively implemented. However, the quality of support is in the eye of the beholder. For example, users of IBM's NCP Packet-Switching Interface, which permits an IBM front-end processor to appear as an X.25 terminal, say they would like easier implementation and better support.

Support for higher OSI layers is still not available in the U.S. According to IBM, this is because the demand isn't there. But, in fact, it is difficult to imagine IBM providing as efficient a support for OSI and X.25 as it does for SNA interfaces.

The long-range effects of Integrated Services Digital Network (ISDN) are difficult to predict. In the short run, ISDN will probably stimulate new applications rather than replace SNA in existing networks. It will be interesting to see how long it takes for ISDN to take switching functions over from SNA.

What lies ahead?

A second and broader challenge is to enhance without disruption. IBM has identified a number of requirements that it sees for SNA in the future. The company wants to lift all addressing limitations in SNA. It would also like to provide more flexibility in implementing routing tables and allow incorporation of network topology changes without the need for a system generation.

IBM has also indicated its awareness that interconnections between local-area networks and SNA networks are becoming more important and that the need for high-capacity gateways to and from LANs is increasing.

Other trends and requirements include the following:

- **Distributed processing.** The LU6.2 programming interface, also referred to as the open LU6.2, will probably be used mostly by software houses to develop turnkey applications. Since LU6.2 provides only a foundation architecture for generalized distributed processing, the availability of application-specific packages is a pre-condition for its success.

Early LU6.2 applications will apparently be for system-type functions such as software and document distribution.

Users can probably also expect to see increasing availability of off-the-shelf LU6.2 applications for various machines and computing environments.

> THE introduction of SAA does not imply a total revamping of SNA products and interfaces. A number of its features already exist in various IBM products.

A distributed version of IBM's DB2 is reportedly in the works as well. In addition, LU6.2 has been proposed for adoption by the International Standards Organization as a standard for transaction services and could be adopted with some modifications.

Right now, Low-Entry Networking using PU2.1 to support sessions between logical units that are not host-resident requires either a separate network or a host to process the session initiation. Neither solution seems optimum, and, given the current System Services Control Point in the host, IBM will find allowing truly host-independent sessions difficult. In addition, the company has not made a statement about whether Advanced Peer-to-Peer Networking will be incorporated into SNA.

- **Systems Applications Architecture (SAA).** The introduction of SAA does not imply a total revamping of IBM SNA products and interfaces. A large number of its features already exist in various IBM products. However, users should remember that there is no such thing as absolute portability, and it will likely be a few years before even basic portability is available.
- **Transport.** To anticipate some of the changes in the transport network, understanding the distinction between the network access architecture and the transport internal architecture is important.

While PU2 and 2.1 define access protocols, subarea nodes — VTAM and NCP — define internal transport architectures. IBM is making public only the access protocols; internal transport protocols are available only to IBM product license holders or under nondisclosure agreements. While many users will not care what transport architecture is used internally, this gap will create problems for vendors that want to build SNA backbone-compatible products.

What users do care about are factors such as ease of implementation, administration and management, and, right now, SNA routing structures are fairly complex to administer. SNA's Path Control Network currently provides up to eight end-to-end virtual routes between any pair of network nodes. While route failures are communicated automatically, network nodes do not automatically learn about changes in the network.

Logical switching, such as that provided by the Path Control Network, would become less important as a more intelligent physical layer is provided by T1 bandwidth management systems or ISDN. This layer could make physical link failures and their recovery transparent to SNA, in effect providing perfect SNA virtual routes that never break down or become congested.

IBM will start to offer more in high-bandwidth systems, starting with its Token-Ring as well as products such as its new front-end processor, the 3745, and host-to-host connections via IBM 3737 over T1 links.

- **Network management.** IBM network management is provided through its host-based Netview, which has consolidated and enhanced a number of earlier products. Recent enhancements in ease of operation, systems management and remote operation have been impressive, but other features such as IBM's Command List Language could be improved for ease of use.

To accommodate non-SNA and non-IBM network management systems, IBM offers Netview/PC, which provides a foundation for a gateway to transform non-SNA network management information into a form compatible with the host Netview. Netview/PC is fine as a concept, but it is cumbersome and frustrating to operate, and today's IBM PC-DOS-based environment is just not powerful enough to support it. Users will have to wait and see how much relief OS/2 brings.

SNA Management Services, the architectural foundation for Netview and Netview/PC, appear to be a compendium of existing capabilities with some extensions, with no flow control for management data. The architecture is incomplete and requires more definition before IBM can provide capabilities.

Right now, Netview's only direct competition is from Cincom Systems, Inc.'s Netmaster. However, as AT&T starts rolling out its well defined and comprehensive Unified Network Management Architecture, there should be more excitement.

SNA has changed significantly since its inception, and if anything, the pace of change has accelerated in the last two years. IBM appears well aware of SNA's limitations and deficiencies. How quickly it overcomes them remains to be seen. •

Kapoor is vice-president and a principal at Kaptronix, Inc., an SNA consulting firm in Haworth, N.J.

Systems Network Architecture: A chronology

1974 Announcement of SNA for single-host tree-oriented networks under DOS; no locally (channel) attached devices, no support for switched lines offered; IBM 3600 the only SNA device

1975 SNA (VTAM) support for MVS available; point-of-sale terminals included under SNA

1976 Primitive multihost support; addition of support for switched lines

1977 Multihost Advanced Communications Function products available that allow interconnection of single trees; CCITT X.25 adapters announced in Canada and France

1978 Introduction of first SNA network management application, Network Communication Control Facility; LU6.0 announced

1979 Parallel LU-to-LU sessions for CICS and IMS (LU6.1); Network Terminal Option, Network Problem Determination Application introduced

1980 Multiple routes, parallel links, network-level priority and congestion management and fully meshed transport available; distinction between local and remote Network Control Program (NCP) software disappears

1981 NCP Packet Switching Interface (NPSI), SNA-to-X.25 gateway become available

1982 LU6.2 and Document Interchange Architecture introduced; LU6.2 available only on CICS

1983 Multiple network connectivity via SNA Network Interconnection provided and PU2.1 introduced; VTAM Extended functions incorporated in VTAM; new front-end processor 3725 announced

1984 Enhanced Network Addressing for larger networks; Network Logical Data Manager, Systems Network Architecture Distribution Services and IBM Cabling System announced; direct SNA support available under VM

1985 John Akers takes over as IBM chief executive officer; Token-Ring announced

1986 Ellen Hancock takes over as president of IBM Communication Products Division; enhanced network management available — Netview announced, Token-Ring support available under Netview; IBM 9370, Advanced Peer-to-Peer Networking and small front-end 3720 announced; IBM announces agreement with Network Equipment Technologies to market the latter's Integrated Digital Network Exchange T1 management system

1987 Systems Application Architecture announced; expanded networking capabilities — switched and multipoint subarea links — announced; Netview enhanced to include operating system management; Netview/PC announced; IBM 3737 announced for remote channel-to-channel connections over T1; IBM's participation in Integrated Services Digital Network trials in Europe

1988 High bandwidth support — 3745 announced, 3737 enhanced; PU2.1 support under subarea nodes offered, NPSI enhanced

CW CHART

LU6.2

FROM PRECEDING PAGE

when accessing its IBM IMS system. "We look forward to the day when all the back-end processors will speak LU6.2," Kimball explains.

IDC's Doyle says there are three reasons why LU6.2 is still far from mainstream implementation. First, he says, IBM has not yet sufficiently shown and marketed the advantages of LU6.2. Second, customers have had implementation problems and insufficient help from IBM.

"IBM doesn't have any good guidelines for how people should split their applications [running part of an application on a mainframe and part on a PC]. It is telling people that they should do this," he says. "But [splitting applications] involves not only writing new PC applications but also rewriting mainframe applications. How should that be done? What's efficient? We haven't even gotten to a prototype stage there."

UCLA's Gerber

According to Bernd Harzog, senior product manager of LAN communications at Digital Communications Associates, Inc., IBM's developers' conferences for OS/2 Extended Edition prove Doyle's point.

These conferences include instruction on writing applications to IBM's Advanced Program-to-Program Communications (APPC), Harzog says, but they do not fully address design issues such as what part of the application to put on workstations and what segment to leave in the mainframe.

It will probably take 10 years, Harzog adds, before the typical in-house programmer has a good understanding of that particular issue.

Over the long-term, Doyle regards LANs as the most likely arena for LU6.2 applications.

Currently, there is a hitch in deploying LU6.2 in this environment — IBM's APPC/PC, the best-known LU6.2 product, does not leave enough memory to enable applications to be written on top of it, causing many users to avoid using it altogether.

Third-party vendors have recently come out with products that require less memory, but these are still too new to determine what their influence will be.

Currently, the LAN arena is still dominated by protocols such as Nethios and Xerox Network Systems, among others.

OS/2 will solve the memory problem, Doyle says, but it is still not likely to produce an immediate stampede toward LU6.2. "We don't expect that people are going to be jumping on OS/2 very quickly," he says.

Alternative route

An alternative lies in LU6.2 gateways that run on LANs and concentrate most of the LU6.2 code in the gateway, greatly reducing the amount of memory required in each workstation.

Eicon Technology Corp. already offers such a gateway that uses the CCITT X.25 standard, and a number of other vendors, including Novell, Apple Computer, Inc. and Communications Solutions, will release products soon.

The Social Sciences Computing Group at the University of California at Los Angeles (UCLA) has been beta-testing one such gateway, Netware LU6.2 from Novell, and plans to use it in the future for LAN-to-mainframe communications, according to Barry Gerber, administrative director of the group.

The main use of LU6.2 at the university, however, will probably be for various kinds of statistical analysis on mainframes, minis and micros. Jobs might be assigned to particular machines based on the suitability of the machine for the job and the current load on various processors.

The UCLA group manages 18 Netware LANs and also operates an IBM 4381 mainframe with 150 hard-wire terminals. All 600 Netware workstations can also access the mainframe using terminal emulation, which is based on Novell LAN-to-mainframe products. An IBM 3090 mainframe, operated by UCLA's Office of Academic Computing, is also accessible from the LANs.

UCLA has not used LU6.2 for LAN-to-mainframe communications up to this point, Gerber says, because mainframe support for LU6.2 is dependent on CICS and the Academic Computing office is not CICS-oriented. The office is waiting for the new release of VTAM, expected this fall, which will support LU6.2 outside the CICS environment.

"So far," Gerber says, "we are just testing a little bit, using PCs. It certainly works. In some ways, it is overkill. We don't need LU6.2 to get a PC to talk to a PC on the network. Novell provides protocols such as IPX and SPX that work just as well for PC-to-PC communications. We don't see turning to LU6.2 for that in the near future."

Gerber also does not foresee using LU6.2 for PC-to-PC communications under OS/2. "The key for us is to have a way to run OS/2 in the networking environment, and Novell now gives us that," he says.

However, micro-to-micro communication via LU6.2 may be appropriate in at least one instance, Gerber says — connecting Apple Macintoshes to IBM PC networks. The Macintoshes are a special case, because UCLA currently has no way to allow Macintoshes to use Netware disks or exchange mail with Netware users.

Gerber says he hopes to test a Netware-to-Mac link that Novell is currently developing and to try connecting Netware workstations with Macintoshes using Apple's MacAPPC and Netware LU6.2.

Not for us?

It is also possible that LU6.2 may not be necessary at UCLA, depending on what other facilities Novell provides with the Netware-to-Mac link. However, LU6.2 is one of the few factors common to both the Mac and DOS environments.

Another company starting to experiment with LU6.2 on LANs is Aetna Life & Casualty in Hartford, Conn.

Aetna maintains a heavy investment in LANs, according to Rick Segal, a technical adviser in Aetna's Commercial Insurance Division Systems department. Aetna has IBM mainframes but few terminals.

Instead, the standard means for accessing mainframes is through LAN gateways. The LAN possibilities are numerous, with 30 file servers in the home office and approximately 125 in 50 field offices. Segal estimates the number of PCs in Aetna's offices nationwide at 1,500.

Aetna has at least two things in common with UCLA. It is using Netware LU6.2 and it has no production applications yet.

Segal would like to see LU6.2 applications in three areas. The first would provide connectivity to Digital Equipment Corp. Microvaxes and VAXs over Ethernet from Netware LANs and other LU6.2-compatible environments. The second would provide connectivity from Netware LANs to IBM hosts. The third is for PC-to-PC connectivity.

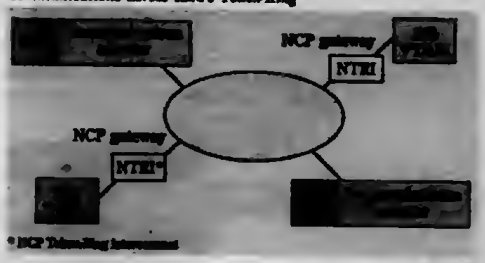
LU6.2 could be cost-effective as a means of implementing workstation-to-workstation disk sharing, file transfer and messaging, Segal says. Because Netware LU6.2 does not require any gateway hardware for workstation-to-workstation communication and Novell will bundle Netware LU6.2 with Netware, there will be no hardware or software costs.

Segal does not find LU6.2 particularly complicated or hard to work with. "You don't need a degree in computer science," he says, "as long as you have good sample code and documentation."

Segal prefers LU6.2 to alternative protocols as it is an industry standard supported by IBM and other vendors. "I like to be comfortable," he explains. •

Subarea gateways

The latest release of IBM's Network Control Program, announced for December availability, will enable host-to-host 'cross-domain' communications across IBM's Token-Ring



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Truce declared with X.25

BY STEVE JACKOWSKI

Since the early 1980s, fierce verbal battles have been waged over whether IBM's Systems Network Architecture (SNA) or CCITT's X.25 is the superior networking architecture. This debate has always been pointless, since it attempts to compare two unlike things — SNA, which is a complete seven-layer network architecture, and X.25, which is not a network architecture at all, but a recommendation describing a standard method of connecting to public packet-switching networks.

What is even worse, however, is the fact that this pointless wrangling has cut IBM users off from the benefits that can now be derived from the integration of SNA and X.25.

In spite of the fact that advances such as the introduction of LU6.2 have facilitated peer-to-peer connections in SNA networks, use of Synchronous Data Link Control (SDLC) as the basic link protocol between nodes has forced hierarchical topologies on most SNA networks. Its half-duplex, polled, master-slave features have created performance problems in multipoint and satellite communications, restricted use of dial-up connections and forced users to lease dedicated circuits that might have been unnecessary in non-SNA networks.

Using X.25 in SNA environments can solve such communications problems and offer connectivity options not normally considered in IBM shops.

In the last two years, IBM has announced support of X.25 connections for virtually all of its machines, from large mainframes and associated communication cluster controllers to System/36 and 38 systems. X.25 gateways exist for local-area networks, and X.25 is a fundamental part of OS/2 Extended Edition.

Unfortunately, IBM's marketing force has little training in the use of packet-switching networks and no expertise in the non-packet-switching uses of X.25.

Benefits of packet switching

Most public packet-switching networks offer leveraged communications facilities. That is, they lease high-speed backbone circuits and, through multiplexing and concentration, can then make data transmission cost-effective to their users.

Since public networks charge by the amount of data sent, not by the distance it travels, use of public packet-switching networks is most effective in dial-up environments in which there are numerous locations with limited volumes of data. Private packet networks are effective when diverse types of systems using different protocols need to share a common network. Packet-switching networks can provide reliable transmission in areas where line quality suffers.

Use of packet-switching networks does not require X.25. But because X.25 connections are full-duplex, nonpolled and cost-effective in connection to networks, many vendors have developed PADs to convert non-X.25 protocols to X.25. These PADs now allow asynchronous, binary synchronous communications, SDLC and other types of devices to access packet-switching networks while still using X.25 connections.

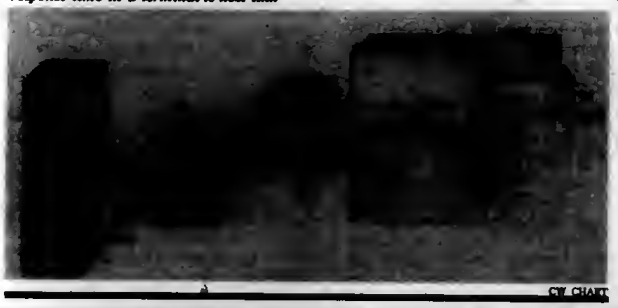
In a pure SNA environment, there is no technical risk in using packet-switching networks. SNA support across packet-switching networks is straightforward for virtually all IBM systems. Qualified Logical Link Control (QLLC), a packet assembler/disassembler (PAD) protocol, is used to place SDLC frames in X.25 packets, allowing transmission of SDLC

Continued on page S12

Jackowski is lead consultant at Synergy Communications, Inc. in Scotts Valley, Calif.

A combined effort

CCITT X.25 provides efficient use of network bandwidth and can result in better response time in a terminal-to-host link



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Token-Ring protocol is SNA's best booster

BY KEVIN TOLLY

IBM's high-speed Token-Ring local-area network protocol is so well suited to SNA applications that it could justifiably be called SNA's newest transport medium.

Until its advent, two transport media were available in the Systems Network Architecture (SNA) world — Synchronous Data Link Control (SDLC) and IBM 370 channel connections. Both suffer from significant limitations. Lack of speed is the difficulty with SDLC links, which normally range from 9.6K to 25.6K bit/sec. The 370 channels, on the other hand, can carry data at speeds of 3 million byte/sec. but limit the number of device types, such as CPUs, front-end processors (FEP) and 3174 cluster controllers, eligible for channel connections. Without special channel extenders, these devices must be located in the same room.

The Token-Ring, however, delivers the high-speed performance of the 370 channel connections with the flexibility of device connectivity associated with SNA-SDLC communications links. Furthermore, the Token-Ring does this at distances substantially greater than those commonly attainable with 370 channels.

When the Token-Ring network is used, it is not only possible to channel-connect scattered FEPs, CPUs and 3174 cluster controllers without extenders but also to attach devices such as IBM Personal Computers to the host at channel speeds.

When Token-Ring networks began arriving in corporations several years ago, their purpose was almost always to provide transport services for file- and print-server functions.

Misunderstood protocol

Although early use concentrated in these areas because they were the first end-user functions offered by IBM or any other vendor, this initial specialization caused many to falsely conclude that the Token-Ring was equal to file server. This mistaken impression has led most mainframe communications managers to overlook the Token-Ring's important role as SNA's third transport medium.

What these managers do not realize is that the Token-Ring is a very low-level function designed to shuttle packets of information from ring station to ring station in a fast and efficient manner. It is not concerned with the contents or high-level protocols of the user information it carries. It also does not care whether the ring station with which it communicates is a PC, System/36, 3174 or FEP. Since all those devices must conform to Token-Ring standards, they are native devices on the network.

THE TOKEN-RING delivers the high-speed performance of the 370 channel connections with the flexibility of device connectivity associated with SNA-SDLC communications links.

In order for the SNA protocol to be used across LANs, IBM needed to modify the SNA Path Control layer to interface with the IEEE Logical Link Control 802.2 standard. Doing this allowed the functions provided by the upper layers to be made available to users via high-speed LANs.

In 1987 and early this year, IBM broadened both the range of SNA devices that can attach to the Token-Ring and the functions they can perform. The existing connectivity options are the following:

- **Host gateways.** IBM currently offers a Token-Ring gateway as an option on current models of its FEP line, certain models of both local and remote 3174 cluster controllers and the 9370 Information System. In much the same way that a FEP repackages data carried via SDLC links and then passes it to the host through a 370 channel, the Token-Ring gateway performs this function for Token-Ring-to-SNA host communications.
- **Communicating with cluster controllers across the Token-Ring.** Any computer that can both attach to the Token-Ring and emulate an SNA PU2 cluster controller can access SNA hosts via a Token-Ring gateway across the ring. This type of communication is by far the most prevalent in SNA networks.

A number of types of cluster controller sessions are supported across the Token-Ring. For instance, PCs running programs like IBM's 3270 Emulation Program and LU6.2 applications such as

Continued on page S12

Tolly, a consultant specializing in IBM connectivity, is manager of telecommunications and office systems at BMW of North America in Montvale, N.J.

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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Will Attachmate's local-area network gateway support a direct IBM Token-Ring connection to a 3174 control unit?

Stan Podkulski
General Electric Co.
Schenectady, N.Y.

ATTACHMATE CORP.: Yes. Release 1.2 of the Gateway Option for Extra! Connectivity Software, which will be available this summer, will support direct Token-Ring connections to a 3174 control unit, 3725 or 3745 communications processor or to a 9370 and transmission speeds of 4M bit/sec., resulting in much faster data transfer than is possible with conventional synchronous data link control links. The release is scheduled to be available this summer.

For users who have both direct-connect 3270 devices and the Microgate emulator, are there any plans to modify the keyboard mapping so that the Enter key can be used for cursor positioning and an alternate key or two-key sequence, such as Alt-Enter, would indicate the Enter process? If so, when will this be available?

John Nugent
Reil, Inc.
Washington, D.C.

MICROGATE CORP.: Keyboard mapping, added to our 3270/Systems Network Architecture emulator as a result of customer input, allows the user to remap the entire keyboard if desired. The KBDMAP command is described in the current users' guide. Updates are available for anyone with an early version of the emulator.

Is it possible to use the Bluelynx 5250 Gateway in an IBM Personal System/2 Model 80 concurrently with the IBM 3270 Gateway? In addition, will this product support autodial commands in the future?

Bill Dyla
Algemene Bank Nederland
New York

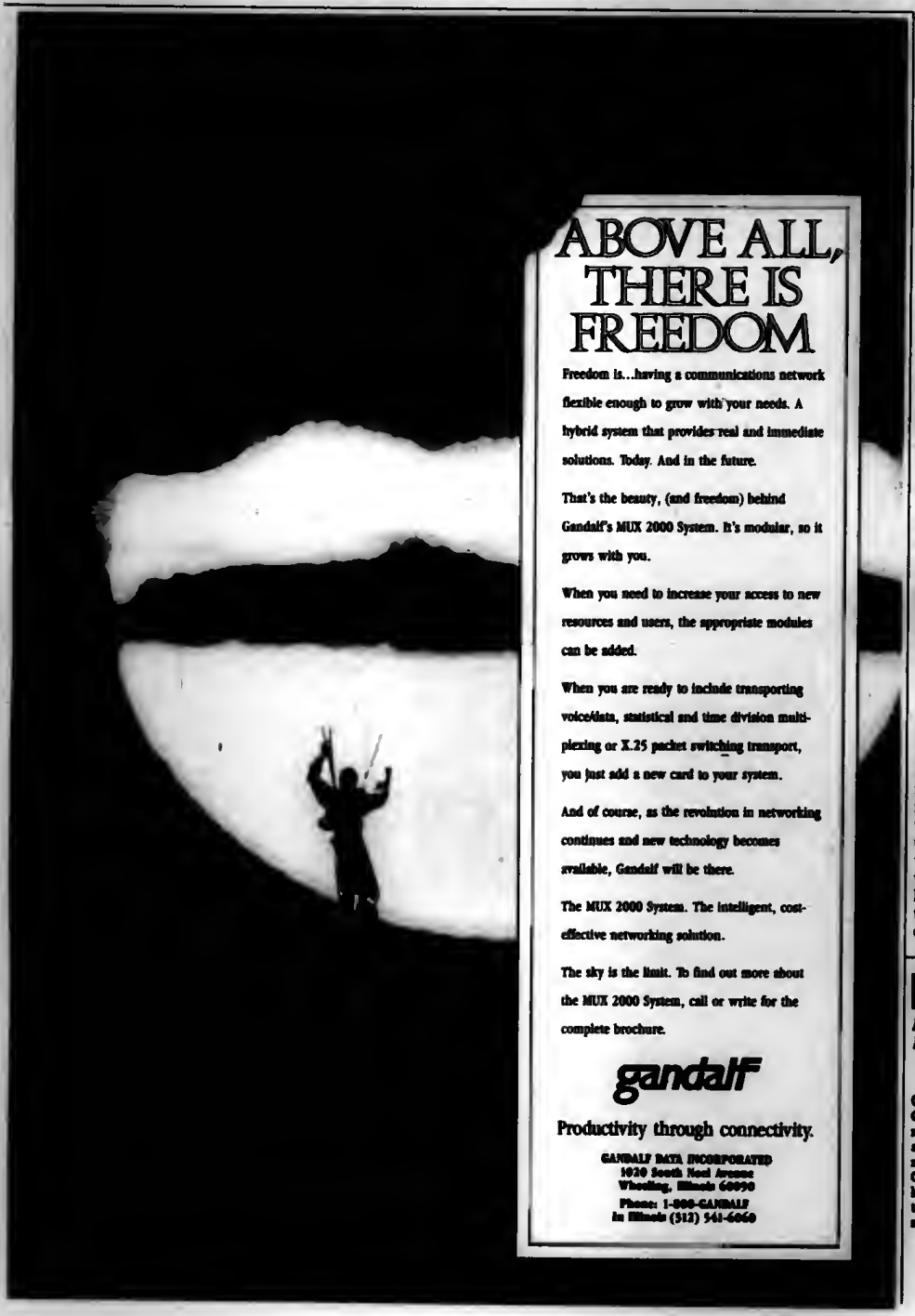
BLUELYNX: With Bluelynx gateways, a 5250 and a 3270 Gateway can be used in the same PS/2 Model 80. These gateways can be any combination, either local or remote, allowing 5250 and 3270 sessions to reside on the same machine simultaneously. Users can actually switch between host systems with the touch of a key.

Autodial capabilities are planned; some products already have this support.

Will Rabbit Software's Rabbitgate be coming out with diagnostic/administrator functions that can be accessed from a network workstation?

Rich Hopfer
Shearson Lehman
Commercial Paper, Inc.
New York

RABBIT SOFTWARE CORP.: Yes. Rabbit will offer a logical unit monitor that can be accessed from either the gateway or a network workstation. The first of these functions will be available with Rabbitgate Release 4.0, which is due out in the second half of this year. Additional functions will be added as the market demands. •



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More than one way to follow the leader

BY ANNETTE NEKORANIK

Many third-party vendors support IBM's Systems Network Architecture (SNA), but not all support the same SNA protocols. Which SNA protocols these vendors choose to support depends on three factors: the size of the current market for devices using that protocol, the protocol's strategic importance and the difficulty of implementing it.

The majority of vendors today support IBM's SNA 3270 environment. Emulation of this environment is a practical solution to micro-to-mainframe communications, and the 3270 interface accounts for more than 90% of all micro-to-mainframe connections.

Third-party vendors are also attracted to program-to-program communications, best known by its LU6.2 designation. Most have announced support for LU6.2 because of its importance in IBM's communications strategy, but the demand for LU6.2 products is still relatively small.

SNA is anything but a simple communications environment. SNA devices are identified by its combination of physical units (PU), which manage the local hardware connection environment; and logical units (LU), which represent points at which a user interacts with the network.

SNA currently defines six classes of LUs, the most important of which is LU2, representative of the IBM 3270 Information Display System. Independent communications vendors that support LU2 on the IBM Personal Computer include Novell, Inc. and Digital Communications Associates, Inc. (DCA). Among the minicomputer vendors that support LU2 emulation are Digital Equipment Corp., Data General Corp. and AT&T.

IBM is stressing several features of the 3270 environment. One is the 3270 Distributed Function Terminal (DFT) mode, a method of 3270 coaxial connection that offers up to five concurrent sessions on one cable. Novell and DCA offer DFT-mode local-area network gateways, and DFT mode is supported on coaxially attached products from almost all micro-to-mainframe link vendors.

IBM also stresses its Enhanced Connectivity Facility, which is mechanized via the Server Requester Programming Interface (SRPI).

SRPI requests and responses are exchanged between host applications and PC or minicomputer programs. IBM's 3270 emulation products support SRPI, but most third-party products offer no special SRPI support.

LU6, another important LU class, includes LU6.2. IBM's relatively inexpensive Advanced Program-to-Program Communications/PC has made the market for LU6.2 on the PC less attractive to third-party vendors, but nearly all minicomputer and mainframe vendors are at some stages of developing an LU6.2 strategy.

Like SRPI, LU6.2 supports communications between applications but in a form not restricted by 3270 device considerations. LU6.2 supports multiple unidirectional sessions between programs and, as such, may replace SRPI where applications communications are needed.

As a connection technology, however, LU6.2 is uneconomical because each LU6.2 partner must provide a serial communication connection to a cluster controller, an expensive option for companies with many PCs.

> SNA IS anything but a simple communications environment.

No host needed

Accompanying LU6.2 is PU2.1, a member of the more general PU2 class, which represents cluster controller nodes such as the 3270 cluster controller workstation.

PU2.1 is an element of IBM's Low-Entry Networking (LEN) environment, in which SNA communication can occur without an SNA host. With PU2.1, PCs and minicomputers can communicate in SNA environments that do not contain a host and can communicate without host intervention in host-based SNA environments. Most minicomputer vendors can emulate a PU2.1 node but have yet to provide all the features of LEN.

In addition to PU2, SNA defines PU1, 4 and 5. A PU1 device is a single, nonclustered tool that functions as an end-point in an SNA network. Communications controllers or subarea controllers in an SNA ntwork are PU4 nodes. They have no LUs and are associated only with the routing of data and front-end connection and concentration for the SNA host.

PU5 refers to the System Service Control Point (SSCP), which represents an SNA host. IBM implements SSCP features fully in its VTAM software. No other vendor implements SSCP features fully, although some offer limited host emulation. No discussion of SNA is complete without a mention of IBM's Systems Application Architecture (SAA). SAA specifies LU6.2 and SRPI as interconnection protocols. But, as even IBM admits, it will probably not be in place before the early 1990s. For the near future, ordinary 3270 will remain the dominant SNA protocol environment. •

Nekoranik is senior editor at Faulkner Technical Reports in Pennsauken, N.J.

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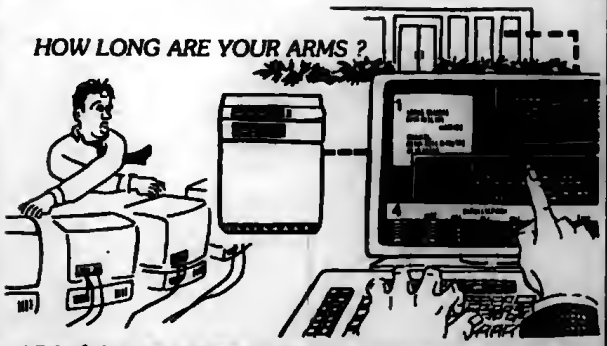

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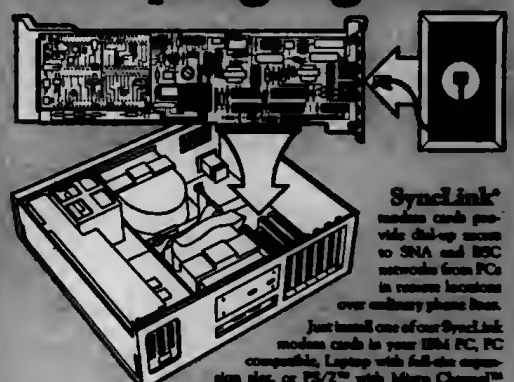

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LAN-to-SNA gateways

COMPANY	PRODUCT	GATEWAY MICROPROCESSOR/ OPERATING SYSTEM	WORKSTATION OPERATING SYSTEMS SUPPORTED	SUPPORTS MULTIPLE HOSTS	LINK-LEVEL INTERFACE TO HOST SUPPORTED	PROTOCOL USED ON LAN	SNA LU TYPES SUPPORTED	MAX. NO. SIMULTANEOUS PU SESSIONS PER GATEWAY	MAX. NO. SIMULTANEOUS LU SESSIONS PER GATEWAY	STATIC OR DYNAMIC ALLOCATION OF LOGICAL UNITS	NO./TYPE SIMULTANEOUS PU SESSIONS PER WORKSTATION	DFT OR CUT	FILE TRANSFER SUPPORTED	BATCH OR ON-LINE	ALL-POINTS-ADDRESSABLE GRAPHICS	APPLICATION PROGRAMMING INTERFACES AVAILABLE	SUPPORTS APPC-PC	PRICE
Advanced Computer Communications (805) 963-8431	ACCIS/MVS software with ACS 3210 hardware	Multiple 68000/ Proprietary	NA	No	Channel attached	TCP/IP over Ethernet 802.3	LU0, 1	NA	100+	Dynamic	NA	NA	Bidirectional	On-line	No	Yes	No	$17,500 (software); $29,000 (hardware)
Apollo Computer, Inc. (617) 256-6600	Domain 3270 Emulation	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC[2]	Domain Network Services	LU2	Two	64	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$1,800
	Domain 3770 Emulation	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC	Domain Network Services	LU1, 3	Two	12	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$1,800
	Domain LU6.2	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC	Domain Network Services	LU6.2	Two	255	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$6,000
AppTech Corp. (617) 268-4600	SNA/ Gateway	68000/ PSDS	CICS, VTAM	Yes	SDLC	Outlink	LU1, 2, 3	One	32	Both	NA	Neither	No	On-line	No	No	NP	$13,000
AST Research, Inc. (714) 863-1333	AST-SNA Gateway	Zilog 280/ PC-DOS	PC-DOS	No	SDLC	Netbios	LU2, 3	One	16	Both	One display, two printers	CUT[3]	Bidirectional	On-line	No	Yes	No	$1,295
AT&T (201) 600-7979	AS/Gateway Single Board Solution	32-bit, 8-MHz 20010	MS-DOS	Yes	SDLC	Netbios	LU1, 2, 3	One	32	Dynamic	Five printers or displays	Neither	Bidirectional	Both	No	Yes	No	$2,595-$6,395
Attachmate Corp. (206) 644-6010	Extra, connectivity software with gateway option	NA/DOS	DOS 3.0 or higher	Yes	SDLC, Token-Ring	Netbios	LU1, 2, 3	One	128	Both	Four (one printer)	DFT[3]	Bidirectional	Both	Yes	Yes	No	$475
Burgess Systems, Inc. (617) 890-1000	Vista	68000, 80386 or 80286/ Proprietary	MS-DOS	Yes	SDLC, BSC[5]	Netbios, TCP/IP, Vista	LU1, 2, 3	Three	96	Dynamic	Two displays, one printer	Neither	Bidirectional	Both	No	Yes	No	$1,695-$4,995
Bluelynx (800) 833-4696	Bluelynx/ 3251-11 Gateway	Zilog 280/DOS	DOS	Yes	SDLC	Netbios	LU4, 7	Seven	49	Both	Any combination of displays, printers	Neither	Bidirectional	Both	No	Yes	No	$1,800
	Bluelynx/ 3250 Gateway Remote	Zylog 8530 SCC/DOS	DOS	Yes	SDLC	Netbios	LU4, 7	Nine	81	Both	Any combination of displays, printers	Neither	Bidirectional	Both	No	Yes	No	$1,995
Chu Software (800) 346-2486; (800) 435-8000 in MI	PC LAN-3270 SNA	80486 supercomputer/VRTX	DOS (68000, 80386)	No	SDLC, BSC	Netbios	LU0, 3	One	32	Dynamic	One printer, one display	CUT	Bidirectional	On-line	No	Yes	No	$1,995
Communications Solutions, Inc. (408) 980-1110	Mosaic SNA Gateway	Chip/DOS	DOS	Yes	SDLC	Netbios	LU1, 2, 3, 6.2	One	32	Both	NA	Neither	Bidirectional	Both	No	Yes	Yes	$4,995
Connection Computer Corp. (800) 621-8884	IBM Gateway	NA/OS/2 and then on Xenix Unix System 5	NA	Yes	SNA, SDLC, BSC, X.25	OSP	LU0, 1, 2, 3	254	16,320	Both	32 printers or displays, six SDLC connections	Neither	Bidirectional	Both	No	Yes	No	$[illegible]-$1,500
Convergent Technologies, Inc. (408) 434-3545	SNA Network Gateway	CTIX (Unix)	Proprietary	Yes	SDLC	Proprietary	LU1, 2, 2, 6.2	Four	128	Static	Four	CUT	No	Both	No	No	No	NP
Curtus Systems, Inc. (408) 241-4300	Omnipus SNA 3270	Proprietary	PC-DOS	Yes	SDLC	Netbios	LU0, 1, 2, 3, 6.2	32	256	Both	Nine	DFT	Bidirectional	Both	No	No	Yes	$6,500
Data Interface Systems Corp. (800) 361-4344	DI3270	NA/DOS	Netware Version 2.0 and up	Yes	SDLC, BSC	Novell IPX[6], Netbios	LU2, 3	One	254	Both	Four displays or printers	Both	Bidirectional	Both	No	Yes	No	$1,900 (eight LUs); $4,495 (254 LUs)
Dataquest Corp. (818) 889-9000	Vista-Gate SNA Gateway	Intel 80286, 80386/ MS-DOS	Dataquest Intel, MS-DOS	No	SDLC, SLLC[7] X.25	Dataquest ARC	LU1, 2, 3, 6.2	One	16	Both	Eight; any two emulators such as 3270, 3287, 3777 or Remote[8] (non-manual job-processing)	CUT	Bidirectional	Both	No	Yes	No	NP
Digital Equipment Corp. Contact local sales office	Decnet/SNA	Proprietary	VMS	Yes	SDLC	Decnet	LU0, 1, 2, 2, 6.2	Two	64	Both	Unlimited	CUT	Bidirectional	Both	Yes	Yes	Yes	NP
	VMS/SNA	Proprietary	VMS	Yes	SDLC	Decnet	LU0, 1, 2, 2, 6.2	One	16	Both	Unlimited	CUT	Bidirectional	Both	Yes	Yes	No	NP
Digital Communications Associates, Inc. (800) 348-3221	Irmaline SDLC Gateway	NP	DOS	Yes	SDLC	Netbios	LU1, 2, 3	One	32	Both	Four displays, one printer	DFT	Bidirectional	Both	Yes	Yes	No	$1,395
DSC Master Systems, Inc. (408) 439-8323	MEX/COM SNA Communications Gateway	Intel 80286/ Proprietary	PC-DOS 3.0 or higher/ NEXOS shell	Yes	SDLC	Netbios	LU2, 3	Nine	15	Both	Nine host sessions per PC	DFT	Bidirectional	Both	No	Yes	No	$4,995
Eicon Technology Corp. (514) 631-2592	Access/SDLC, Access/SLLC	68000/ Multitasking	DOS	Yes	SDLC, X.25, Token-Ring	Netbios	LU0, 1, 2, 3, 4, 6.2, 7	32	256	Both	Nine printers or displays	DFT	Bidirectional	Both	Yes	Yes	Yes	$[illegible]-$4,000
Gateway Communications, Inc. (714) 553-1555	G/SNA Gateway	Intel 80120	DOS	Yes	SDLC	Netware	LU1, 2, 3	NP	32	Both	Three consoles, two printers	DFT	Bidirectional	Both	No	Yes	No	$2,500 (eight LUs)
Gandalf Data, Inc. (800) GANDALF	Netserver with LAN[9] software, IBM 3270 Emulation	80186/ Proprietary	NA	Yes	SDLC, BSC	OSI	LU1, 2, 3	16	16	Static	One display, one printer	CUT	No	NA	No	No	No	$11,500

[1]Transmission Control Protocol/Internet Protocol [2]IBM's Synchronous Data Link Control [3]IBM's Systems Network Architecture [4]Control Unit Terminal [5]Display Function Terminal [6]Binary Synchronous Communication [7]Open Systems Interconnect [8]Internetwork Packet Exchange [9]Qualified Logical Link Control [10]IBM's Distributed Office Support System [11]Local-area network [12]Advanced Program-to-Program Communications [13]Remote job entry

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	GATEWAY MICROPROCESSOR/ OPERATING SYSTEM	WORKSTATION OPERATING SYSTEMS SUPPORTED	SUPPORTS MULTIPLE HOSTS	LINK-LEVEL INTERFACE TO HOST SUPPORTED	PROTOCOL USED ON LAN	SNA LU TYPES SUPPORTED	MAX. NO. SIMULTANEOUS PU SESSIONS PER GATEWAY	MAX. NO. SIMULTANEOUS LU SESSIONS PER GATEWAY	STATIC OR DYNAMIC ALLOCATION OF LOGICAL UNITS	NO./TYPE SIMULTANEOUS PU SESSIONS PER WORKSTATION	DFT OR CUT	FILE TRANSFER SUPPORTED	BATCH OR ON-LINE	ALL-POINTS-ADDRESSABLE GRAPHICS	APPLICATION PROGRAMMING INTERFACES AVAILABLE	SUPPORTS APPC-PC	PRICE
[illegible]	[illegible]	NA	[illegible]	Yes	SDLC	TCP/IP	LU0, 2, 3, 6.2	One	16	Both	DFT	CUT	Bidirectional	Both	No	Yes	No	[illegible]
	[illegible] SNA Gateway	[illegible]	[illegible]	Yes	SDLC	TCP/IP	LU2, 3, 9	One	16	Both	64	CUT	Bidirectional	Both	No	No	No	[illegible]
Honeywell Bull, Inc. (602) 861-6020	LUC1013	68020/Proprietary	MS-DOS, others supporting DNS or TCP/IP	No	SDLC	DNS, TCP/IP	LU1, 3	One	40	Both	Eight sessions per display, one per printer	CUT	Bidirectional	On-line	No.	Yes	No	$12,000
[illegible]	[illegible]	[illegible]	[illegible]	No	SDLC, Channel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Yes	SDLC, Token Ring, Channel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Yes	SDLC, Token Ring, Channel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Yes	SDLC, Token Ring, Channel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Intel Network Systems Division (800) 343-0818	Advanced Netpath SNA-3270 RJE	8086/DOS	DOS	No	SDLC	NA	RJE*	One	Six	Both	NA	NA	Bidirectional	Batch	No	No	No	$6,300
	Compute DFT	DF8344/DOS	DOS	No	SDLC, Channel	Netbios	LU1, 2, 3	One	40	Both	Five LUs	DFT	Bidirectional	On-line	No	Yes	No	$1,995 (five LUs: $3,895 (40 LUs)
	Advanced Netpath SNA 3270	8086/DOS	DOS	No	SDLC	Netbios	LU1, 2, 3	One	128	Both	Five LUs	NA	Bidirectional	On-line	No	Yes	No	$2,595 (eight LUs: $6,895 (128 LUs)
	Basic Netpath SNA-3270/X.25	8086/DOS	DOS	No	X.25	Netbios	LU1, 2, 3	One	32	Both	Two displays, one printer	NA	Bidirectional	On-line	No	Yes	No	$1,995 (eight LUs: $3,995 (32 LUs)
	Basic Netpath SNA 3270/SDLC	8086/DOS	DOS	No	SDLC	Netbios	LU1, 2, 3	One	32	Both	Two displays, one printer	NA	Bidirectional	On-line	No	Yes	No	$1,995 (eight LUs: $3,995 (32 LUs)
[illegible]	[illegible]	[illegible]	[illegible]	Yes	SDLC	Netbios	LU7	Two	[illegible]	Both	[illegible]	Both	Bidirectional	Both	No	Yes	No	$6,775
	[illegible] Gateway	[illegible]	[illegible]	Yes	Ethernet or BSC	Channel	LU2	NA	256	Dynamic	NA	Neither	Bidirectional	Both	No	Yes	No	[illegible]
Local Data, Inc. (313) 320-7130	Datalynx/3174	Intel 80186/ Proprietary multitasking	DOS, OS/2	Yes	SDLC, SNA, BSC	Works with any LAN that provides RS-232	LU1, 2, 3	Two	32	Both	One display, one printer	CUT	Bidirectional	On-line	No	Yes	No	$3,000-$10,500
[illegible]	PC Path, Hot Path	[illegible]	None	Yes	SDLC, BSC	Netbios	LU0, 3	40	40	Both	One	Both	Bidirectional	Both	Yes	No	No	[illegible]
Morning Star Technologies, Inc. (614) 451-1883	Morning Star SNA 3270	Any microprocessor running Unix	Unix	Yes	SDLC	NP	LU1, 2, 3	One	32	Both	One	NP	Neither	On-line	No	No	No	$2,750-$3,995
	Morning Star SNA 3770	Any microprocessor running Unix	Unix	Yes	SDLC	NP	LU1	32	32	NP	32 printers or terminals	NP	Bidirectional	Batch	No	No	No	$2,750-$3,995
[illegible]	[illegible]	[illegible]	NA	Yes	SDLC, X.25, BSC	Netbios, SNA, TCP/IP	LU0, 1, 2, 3, 6.2	30	500	Dynamic	One	NP	Bidirectional	Both	No	Yes	No	$6,445
Netlink, Inc. (818) 879-0012	SNA Hub 3723	Intel 8086, 80186/ Proprietary	DOS, OS/2	Yes	SDLC	IEEE 802.2/802.5	LU0, 1, 2, 3, 6.2	64	300	Both	Depends on SNA application, workstation	DFT	Bidirectional	Both	NA	Yes	Yes	$15,495
[illegible]	[illegible]	[illegible]	[illegible]	Yes	SDLC, Token Ring, X.25	LAN Manager	LU0, 1, 2, 3, 6.2	254	128, 000	Both	No limit	Both	Bidirectional	Both	No	Yes	Yes	NA
Robbin Software Corp. (800) RABBITC	Robbinjets	80186/MS-DOS	MS-DOS	Yes	SDLC, BSC	Netbios, IPX	LU1, 2, 3	One	64	Both	Eight displays, two printers	Both	Bidirectional	On-line	Yes	Yes	No	$2,395
[illegible]	[illegible]	[illegible]	[illegible]	No	SDLC	TCP/IP or Ethernet	LU0, 1, 2, 3	One	32	Both	Any mix of displays, printers up to six non-simultaneous	CUT	Bidirectional	Both	No	Yes	No	[illegible]
TDT Group, Inc. (408) 372-0232	SIX/25	8086/MS-DOS	MS-DOS	Yes	QLLC	Netbios	LU1, 2, 3	32	32	Static	Six physical units, one of screen, printer or RJE* station	Neither	Bidirectional	Both	No	Yes	Yes	$1,500 per gateway, $249 per network workstation

COMPANY	PRODUCT	GATEWAY MICROPROCESSOR/ OPERATING SYSTEM	WORKSTATION OPERATING SYSTEMS SUPPORTED	SUPPORTS MULTIPLE HOSTS	LINK-LEVEL INTERFACE TO HOST SUPPORTED	PROTOCOL USED ON LAN	SNA LU TYPES SUPPORTED	MAX. NO. SIMULTANEOUS PU SESSIONS PER GATEWAY	MAX. NO. SIMULTANEOUS LU SESSIONS PER GATEWAY	STATIC OR DYNAMIC ALLOCATION OF LOGICAL UNITS	NO./TYPE SIMULTANEOUS PU SESSIONS PER WORKSTATION	DFT OR CUT	FILE TRANSFER SUPPORTED	BATCH OR ON-LINE	ALL-POINTS-ADDRESSABLE GRAPHICS	APPLICATION PROGRAMMING INTERFACES AVAILABLE	SUPPORTS APPC-PC	PRICE
[illegible]	[illegible]	[illegible]	DOS	Yes	SDLC	TCP/IP	LU1, 2, 3	One	[illegible]	Both	One logical unit	CUT	Bidirectional	On-line	No	Yes	No	[illegible]
	[illegible]	[illegible]	DOS	Yes	SDLC	TCP/IP	LU1, 2, 3	Two	[illegible]	Both	One logical unit	CUT	Bidirectional	On-line	No	Yes	No	[illegible]
3Com Corp. (800) NETSCOM	3+SNA	NP/DOS	DOS	No	SDLC	Netbios	LU1, 2, 3	One	32	Both	Eight	CUT	Bidirectional	On-line	No	Yes	No	$4,995
[illegible]	Netway 1000	Proprietary	Apple OS, MS-DOS	Yes	SNA, SDLC, BSC	Star Applnnkt, SNA, BSC, Netbios	LU2,3	16	16	Both	Eight displays (block de displays (FC)	CUT	Bidirectional	Both	No	No	Yes	[illegible] (software/ software)
Telecomm Corp. (800) 835-0655	TCbit Gateway	Intel 80,186, 286, 386/68C- DOS, CDOS, OS/2	MS-DOS, CDOS, OS/2, asynchronous	Yes	SDLC, BSC, Token-Ring, DFT	Netbios	LU0, 1, 2, 4, 6.2, 7	One	128	Both	NA	Both	Bidirectional	Both	Yes	Yes	No	$2,100 (eight nodes)
[illegible]	Intelligent Connector Unit 3270	3-Bit Proprietary	SNA CUT, DFT	Yes	SNA, SDLC, Non-SNA, BSC	CSMA/CA	LU2, 3	16	16	Both	NA	Both	Bidirectional	On-line	Yes	Yes	No	[illegible] per port
	Advanced Connector Unit 3270	Motorola [illegible]-based	SNA CUT, DFT	Yes	SNA, SDLC, Non-SNA, BSC	1000 802.3 TCP/IP	LU2, 3	32	32	Both	NA	Both	Bidirectional	On-line	Yes	Yes	No	[illegible] per port
Digitronics Corp., Inc. ([illegible] 496-0111	Net/One	80186/ proprietary	DOS	No	Coaxial	Netbios	LU1, 2, 3	One	80	Both	Four displays, one printer	Both	Bidirectional	Both	No	Yes	No	$5,000
[illegible]	[illegible] Gateway	[illegible]/MS-DOS	MS-DOS	No	Ethernet, Token-Ring	Netbios	NA	64	64	NA	NA	Netbios	No	On-line	Yes	No	No	[illegible]
Westlink Communications Corp. (415) 796-1100	Trans SDLC	Motorola 68010/NA	NA	Yes	SDLC	Protocol independent	NA	32	Unlimited	Neither	32	Both	Bidirectional	Both	Yes	No	No	$11,000
[illegible]	Integrated AST 3270	2-Bit Q/Proprietary	DOS	Yes	SDLC, BSC	Netbios	LU2, 3	Two	64	Both	10 printers or displays	DFT	Bidirectional	Both	No	Yes	No	$1,995
Wang Laboratories, Inc. (617) 459-5000	Banyan 3270 Release 3.0	Intel 80386/Vines, Unix V.3	DOS	Yes	SDLC	Netbios, XNS	LU1, 2, 3	Three	60	Both	32 LUs	NP	Bidirectional	On-line	No	No	Yes	$2,000-$7,000
[illegible] (404) 441-[illegible]	3270 Communication Server	Intel/5/Pent	DOS	Yes	SDLC, DFT	Pent	LU2	One	32	Dynamic	Four displays, one printer	DFT	Bidirectional	On-line	No	Yes	No	$1,195
	SNA Server	Xpress/Pent	DOS	Yes	SDLC	Pent	Two	One	32	Dynamic	Four displays, one printer	DFT	Bidirectional	On-line	No	Yes	No	$3,195 (eight LUs); $5,395 (32 LUs)

X.25

FROM PAGE S6

across packet-switching networks. Packet switching is not the only reason for using X.25. Its efficiency and simplicity as well as the availability of ports for X.25 on most major computers manufactured today have led to the development of additional non-packet-switching uses.

Use of direct X.25 connections and QLLC PADs in SNA networks can eliminate many of the performance problems associated with SDLC interfaces and alleviate the problems that virtually all IBM systems have with dial-up connections.

In the mainframe environment, X.25 should be considered for all satellite communication connections. X.25 will improve performance and overall throughput of the link. For international multipoint circuits, response time problems can be eliminated through the use of well-placed PADs with X.25 as the backbone link.

Replacement of multiplexers with X.25 PADs can facilitate cost-effective topologies, since deregulation has adversely affected the cost of multipoint circuits. At the same time, replacement can improve efficiency and throughput of backbone circuits because X.25 actually concentrates data and operates in a full-duplex, nonpolled mode.

In the System/38 environment, X.25 is the most CPU-efficient form of communications and should be used for all CPU-to-CPU communications. Use of QLLC PADs can provide additional communication ports for leased or dial-up circuits. When X.25 is used in this manner, response time is actually improved over standard multiline communications adapters normally dedicated to SDLC connections.

Unfortunately, transporting SDLC across packet-switching networks through PAD protocols such as QLLC does not offer these other advantages of X.25.

Users of machines like the System/38 have to live with the limitations imposed by QLLC, but mainframe users do not. IBM's NCP Packet-Switching Interface (NPSI) offers IBM mainframes access to X.25 capabilities.

IBM has not made integration particularly easy. Since VTAM has become the standard method for mainframe communications, and since VTAM is tightly coupled with SNA, use of NPSI forces applications to establish SNA logical unit (LU)-to-LU sessions with NPSI. A LU-to-LU session must be set up for each X.25 link and each session controlled by an application.

NPSI offers five basic types of X.25 connections called Logical Link Control types. These range from custom PAD interfaces to X.28 and X.29 PADs that support connection of asynchronous ASCII devices.

While the complexity in dealing with development of custom interfaces can be a burden to inexperienced NSPI users, the performance and cost advantages for SNA networks are significant.

Into the future

Because all major public packet-switching networks have announced SNA support, IBM customers can realize the advantages that the ASCII world has seen for more than a decade.

In addition, the proliferation of new PADs offer private networking options. It is worth the required personnel training to realize the benefits of more efficient communications and more flexible network topologies available through X.25 interfaces.

To fully accomplish this, SNA users must put their biases behind them and become familiar with X.25. Integration of SNA and X.25 can provide a competitive networking edge today and facilitate migration to future technologies. •

Token-Ring

FROM PAGE S7

Distributed Data Management/PC and IBM's OS/2 Extended Edition 1.1 Communications Manager can reach the host SNA via the Token-Ring. This capability provides powerful SNA connections to the host network and very high-speed connections to the SNA host when a gateway is used.

In addition, versions of the 3174 are available that attach to the ring as Token-Ring downstream users, not as a host gateway. The downstream 3174 does not support any native SNA transport services — either 370 channel or SDLC — and must use the services of a host gateway. This implementation offers advantages as a means of providing high-speed host connectivity for terminal clusters scattered throughout a facility and as a cost-effective replacement for current SDLC connections in these environments.

System/36 machines also offer a wide range of host connectivity possibilities, such as 3270 emulation, multisession RJE and Host Command Facility. Since the System/36 appears to the SNA host as a PU2 cluster controller, the System/36-to-host connection can also use the Token-Ring and host gateway to access the host SNA network. This provides a flexible, high-speed path between the System/36 and the SNA host.

• **Host-to-host communications across the Token-Ring.** The expected release of Network Control Program Version 5 Release 2.1 in December will make possible cross-domain communications across the Token-Ring. Both FEPs and 9370s connected to the Token-Ring will be able to support multi-CPU, cross-domain or subarea connections. In other words, the FEP and 9370 Token-Ring gateways will now support PU4 and 5 connections in addition to PU2. IBM's projected upgrade of the Token-Ring speed from 4M to 16M bit/sec. makes host-to-host connectivity over the Token-Ring even more attractive.

In many organizations, the strategic importance of the Token-Ring as an SNA transport medium will cause MIS management to move the responsibility for overall corporate LAN directions away from the information center and into corporate telecommunications. Any firm that has committed to SNA as an overall architecture would do well to consider switching to the Token-Ring, thereby combining the power of the Token-Ring and the SNA environment. •

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COMPUTERWORLD 6/20/88

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

IBM-Stratus link tenuous?

The recent announcement affirming the partnership between Stratus and IBM seemingly puts to rest questions about the long-term stability of the deal. But even though all may be smooth on the surface, fundamental forces could threaten the relationship.

Stratus and IBM renewed their agreement, originally signed in 1985, under which IBM resells Stratus fault-tolerant processors as its System/88. The two firms also agreed that Stratus will resell IBM's Systems Network Architecture software.

Thus far, the arrangement appears to have been beneficial for both companies: In accounts in which Stratus would have had no chance because of an existing relationship with IBM, the company has been able to have one of its systems installed.

Likewise, in bids in which IBM was faced with a fault-tolerant requirement and risked losing the sale to Tandem, IBM was able to pull the System/88 out of its holster as a "Tandem killer" and gain some profit from the sale — and, more important,

Continued on page 57

GE splitting costs, not atoms

Company trims MIS for nuclear unit as industry growth throttles down

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — As cost overruns and safety concerns increasingly drive nuclear power plants into disfavor and disuse, the computers that run them face the ever-sharpening scrutiny of budget-cutters.

Cutting expenses is the mandate of Robert Carpenter, manager of computation and information systems operation at General Electric Co.'s Nuclear Energy Operations here. "Our in-house budget will be decreased by the end of this year by 40%," Carpenter said.

Streamlining hardware is one way Carpenter is cutting costs. GE Nuclear's hardware currently includes three different brands of mainframes, three different networks and 1,500 personal computers of various brands.

"I ask myself, 'Do I really need DEC, Honeywell and IBM [mainframes]? We have two Ethernets — why?' " he said.

Carpenter's systems are used mainly to design software for turnkey systems that help to run GE Nuclear's plants and handle the firm's finance and accounting needs. The systems support 59 GE nuclear power plants in the U.S., Europe and Asia.

GE's Carpenter

Continued on page 56

Data View

IBM 3090 series holds lead in installed value

Ousting its sister Model 200, the 3090 Model 400 captures the top rank

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Apollo gives users look at $21K workstation

CHELMSFORD, Mass. — Apollo Computer, Inc. gave attendees of last week's Design Automation Conference a first look at the top of its Series 4000 Personal Super Workstation line.

The Series 4000 2-D graphics configuration is a $20,990-and-up entry that offers users a variety of graphics enhancements, including a dedicated graphics processor that dramatically increases overall performance, according to Apollo.

The workstation is part of a family that was recently repriced to let Apollo lay claim to a 4 million instructions per second workstation costing less than $9,000.

The system comes with a 1,280- by 1,024-pixel 19-in. monitor. In addition to a new high-end mark, the Series 4000 will get a floating point accelerator (FPA) that, the company claimed, will increase processing speeds by as much as 300%.

Also announced at the conference was the fact that the FPA will be based on the Weitek, Inc. 3164 floating-point chip.

Aimed at the mechanical computer-aided design and electronic design automation markets, in which simulation, finite element analysis and modeling are key, the Series 4000 FPA will be priced at $3,500. Both the FPA and the Series 4000 2-D are slated to be out in the third quarter.

[illegible]

- Large, [illegible] Highest [illegible] Page [illegible]
- Lowell [illegible] voltage margin. Page 58.

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NETWORKING LEADERSHIP
FROM NORTHERN TELECOM

GE Nuclear

FROM PAGE 53

The computers are also being used to design new Advanced Boiling Water Reactors likely to be sold outside the U.S. These reactor designs are smaller than previous ones, starting at 400MW, and are modular so they can be pieced together as demand for electricity grows.

First, the ax

Carpenter axed a Hewlett-Packard Co. 3000 last year. He said he plans to remove another of the five systems that remain — three Digital Equipment Corp. VAXs, a Honeywell, Inc. DPS90/91 and an IBM 3083 Model EX1.

Other moves include buying transmission time on networks and computing time on mainframes, buying cheaper, non-IBM micros and leasing equipment as needed.

While nuclear power plants are still a big business — Carpenter estimated GE's business at $500 million per year — the base is shrinking; GE's last order for a new reactor was 11 years ago. Also, its maintenance contracts disappear when established plants are shut down. For example, New York's Shoreham nuclear plant, built by GE, was sold to the state for $1 last month, having been run only for low-level testing and never to run again.

GE's nuclear power plant business is now subsisting on contracts for fuel reloading and maintenance, which includes its computer-related products for electric utilities. Those products include software for an emergency response system. "It would give a menu of things to do in case of an accident," Carpenter said. "If there is an accident, it wouldn't be a Chernobyl — maybe a Three Mile Island, but not a Chernobyl."

Trimming the fat

Carpenter, who was transferred from General Electric Information Systems Co. 13 months ago, been not only been streamlining hardware but cutting personnel costs as well. In the first two weeks on the job, he saw that pink slips were delivered to 20% of the work force and has cut another 10% in the year since then.

He also changed the structure of operations. "Before, it was back room-focused. Now it's refocused to be client-oriented," he said. Most clients are in-house users, while a few are users of turnkey systems.

Carpenter's first six months were spent helping the MIS staff define requirements put on the systems and how those requirements could be served better with less hardware.

"The systems were built application by application," he said. Now, the approach is to adapt the systems for all applications. With that approach, Carpenter said he would get rid of one of his mainframes and is leaning toward axing the IBM. "IBM is now the exception rather than the rule, where before it was the rule rather than the exception."

However, he said that certain software products have to be delivered on IBM because that is what the customer ordered. Carpenter said he could write those on an IBM system in another section of GE.

Carpenter also brought in non-IBM PCs. Although still predominantly IBM, 30% of the 1,500 micros at GE Nuclear are either from Packard Bell Electronics, Inc., Compaq Computer Corp. or Apple Computer, Inc. "IBM was not cost-effective. I could buy two [of the other brands' products] for every one IBM," he said.

Carpenter's preferred vendor is, not surprisingly, GE, although he said that cost is the bottom line and GE does not always deliver at the lowest cost. For example, he buys time on GE Information Systems' wide-area network for a user service.

The service, instituted in April, allows GE users worldwide to have on-line access to "product experience reports." Any engineering experience, such as a malfunction, is reported to the network and immediately disseminated to users. Other projects include developing an ordering, shipping and billing system to be used in-house. "It's very modular so it will be able to adapt to constant [office] restructuring," Carpenter said.

Why ADR an
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Most people know BST as the change control specialists. Our competitors would like to keep it that way. Because when you compare library management facilities, theirs just don't measure up to ours. And there's a good reason why.

To effectively implement change control, you first need to manage your source code—not just COBOL card images, but all the components of your applications. This means vendor-supplied code, fourth-generation languages, data base definitions, CASE statements, JCL, parameter libraries as well as all host program languages of any size.

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- Efficient, automatic versioning using sophisticated, space-saving base/delta/comparison technology

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Gibson

FROM PAGE 53

retain control over the account by keeping Tandem out.

At Stratus rollouts, William Foster, the firm's president, has usually been queried about the status of the IBM deal. The answer is usually that things are going fine and that IBM is selling more and more System/88s as its sales force becomes more acquainted with the products.

IBM's sales of the System/88 in 1987 were 25% of Stratus's total revenue, according to a Stratus spokesman. This percentage would appear pleasing to either party. It is a very small part of total IBM sales and is not so large a slice of Stratus's sales pie that the Marlboro, Mass., firm couldn't adapt to life without the IBM mothership — a thought that must always lurk somewhere in the backs of the minds of Stratus officials.

In all probability, the partnership has a time limit, after which it will cease to be useful to both parties.

IBM has said it bids a System/88 only when fault tolerance is a requirement. And although Stratus began life touting fault tolerance as the major attraction of its products, Foster has repeatedly said in recent years that he considers Stratus a vendor of on-line transaction processing (OLTP) systems, not just fault-tolerant ones.

Foster has said he increasingly views fault tolerance as a requirement of all kinds of computing rather than as a narrow niche requirement.

It is this divergence of opinion on the Stratus processor's role that will be the root of any future rift between the firms.

As Stratus gets larger, it will find itself selling its systems for OLTP applications in which IBM is bidding a computer other than the System/88. If Stratus continues its steady rate of growth and Tandem continues to prosper as well, IBM will feel pressure to introduce a fault-tolerant system of its own.

IN ALL probability, the partnership has a time limit, after which it will cease to be useful to either party.

Within the past year, rumors have surfaced that Silverlake, the IBM System/36 and 38 follow-on processor, will be introduced in a fault-tolerant version. Reportedly, Stratus heard these rumors and gained reassurance from IBM that such a processor was not in the offing.

Nonetheless, that rumor has not been entirely dispelled. One consultant says Silverlake will be introduced in a dual-ported version, providing redundant storage. Another says the 9370 with an improved IBM CICS under VM will be IBM's strategic transaction-processing minicomputer.

If Stratus computers continue to be niche products, Stratus will be frustrated, but IBM will be happy. If Stratus products are appealing to a wider audience, Stratus will be happy, but IBM will grow concerned.

Clearly, if Foster's vision of the future — that all systems will offer fault tolerance — is correct, then IBM obviously will have to offer fault tolerance.

The looming conflict could be resolved by IBM's acquiring Stratus. However, Wall Street analysts say there is little reason to think this will happen. IBM is through with meddling with other companies, one says. Another thinks Stratus's stock price is too high.

So when will the honeymoon end?

Perhaps it won't end suddenly. After all, IBM has invested in an on-line support center for the System/88 that is like the one Stratus maintains for its systems. It is more likely that fault tolerance or near-fault tolerance would be introduced as a flavor in different IBM systems. If demand for these systems is strong, IBM will stress them and downplay the System/88.

Gibson is Computerworld's senior editor, systems & peripherals.

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NEW PRODUCTS

Graphics systems

Large-screen, full-color display of computer data is now available on a superprojector recently introduced by **Hughes Aircraft Co.'s Industrial Products Division.**

The **Model 1000** uses xenon arc lamps combined with a proprietary liquid crystal light valve to produce high-resolution displays of graphic and alphanumeric images. Light output is reported to be 1,000 lumens, and resolution is said to be in excess of 1,000 TV lines. The projector setup is controlled via an RS-232 computer bus, the vendor said.

The Model 1000 costs $160,000.

Hughes Industrial Products, 6155 El Camino Real, Carlsbad, Calif. 92009. 619-931-3619.

Data storage

A Desktop CD-ROM Development/Publishing System and a compact disk/read-only memory drive for Sun Microsystems, Inc. workstations running Sun Unix V Release 4.0 have been announced by **Laser Optical Technology.**

The publishing system incorporates **WORM-800**, a write-once read-many drive from the vendor that uses an 800M-byte removable cartridge and offers a reported shelf life of 30 years. The CD-ROM drive is said to have an average access time of 280 msec and can read 600M bytes of data and play 70 min of audio or a combination of both.

The WORM-800 drive costs $5,900. The CD-ROM drive costs $1,095. Quantity discounts are available for both products.

Laser Optical Technology, Suite E, 3004 Mission St., Santa Cruz, Calif. 95060. 408-426-7171.

Terminals

Alcatel Information Systems has announced a family of IBM 3270-type intelligent workstations. The workstations can be attached to 3270, asynchronous, IBM Token-Ring and Ethernet networks and were designed to support single-user network applications.

The product line consists of two separate desktop solutions: **Courier Processing Terminals**, for users requiring complete 3270 display capabilities, and **Courier Communicating Workstations**, which provide a desktop microcomputer system with a built-in network connection.

The processing terminals offer multiple logical units with windowing and host all-points-addressable graphics capability. The system is display-compatible with the IBM 3192G and offers Digital Equipment Corp. VT220 emulation. The Courier Processing Terminals cost from $1,895 to $2,795, depending on configuration.

The communicating workstations are preconfigured with networking hardware and software to comply with individual user specifications. A single-session version enables concurrent operation of one IBM mainframe session and one local DOS application. The multisession version permits simultaneous operation of up to four IBM mainframe sessions and one local DOS application. Pricing for the Courier Communication Workstations starts at $2,355.

Alcatel, P.O. Box 29039, Phoenix, Ariz. 85038. 602-894-7000.

Intelligent Information Systems, Inc. has introduced a product for the IBM System/36 and 38 family called the **IS-353 Remote Access Model.**

The unit reportedly enables a twin-axial remote-site printer or terminal to communicate with a System/36 or 38 over dial-up or leased lines with a data transfer rate up to 9.6K bit/sec. The product accommodates IBM 5250s or compatible terminals and printers.

The IS-353 costs $1,995.

Intelligent Information Systems, 92 Kanas St., Hackensack, N.J. 07601. 800-524-2837.

A terminal that reportedly offers full graphics compatibility with the Digital Equipment Corp. VT330 display unit has been announced by **Lanpar Technologies, Inc.**

Features of the **Max 331** include polygon fill and interactive-mode cursor enhancements. The terminal offers 800-by 500-pixel resolution as well as upload capabilities that permit a set-up library to be stored by the host system.

Max 331 costs $1,195.

Lanpar, 35 Riviera Drive, Markham, Ont., Canada L3R 8N4. 416-475-9123.

Power supplies

A surge protector that suppresses voltage surges and spikes and also provides noise filtering has been introduced by **Lowell Corp.**

The **Emerson Surge Protector** features a master-control socket that can accommodate six devices, five of which reportedly can be controlled by switching a single device.

Equipped with a normal voltage LED indicator, the product's input rating is 120V AC, 60Hz; output is 1,200W; and the circuit breaker is 10A.

The Emerson Surge Protector costs $149.

Lowell, P.O. Box 158, Worcester, Mass. 01613. 617-756-5103.

V.32

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ONE EUROCARD is all it takes to accommodate the fully featured V.32 data pump from Universal Data Systems.

The device is a *true* V.32. It is fully compliant with the CCITT standard for 9600 bps, full-duplex data communications. It operates on dial-up, two-wire private or four-wire private circuits. It handles synchronous or asynchronous data. It offers auto dialing through the AT command set, auto answer and adaptive line equalization. To preserve data integrity under degraded line conditions, it even has a trellis coded mode. An impressive set of diagnostics is also on board.

While the data pump is functionally identical to the industry standard UDS V.32 modem, it has been stripped of its on-board power supply and DAA. These functions can be easily imported via the VME connector.

For the bare facts about technical details and quantity pricing, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35802. Telephone 205/721-8000; Telex 752602 UDS HTV.

TELEPHONE 800/451-2369

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What CASE can't do yet

Loopholes, rough spots and just plain missing pieces

BY TONY PERCY

In Ashton-Tate Corp.'s recent announcement delaying Dbase IV Version 1.0, Chairman Ed Esber was reported as saying, "Theoretically, there are thousands of bugs that we have not found that, through additional testing, would be brought down." Such a comment reflects the sorry state of software development and engineering.

Enter computer-aided software engineering (CASE) technology, whose second-generation tools may well answer MIS prayers for greater productivity. CASE tools promise full coverage of the software life cycle and the ability to build and maintain software systems of all types.

But the promise is not yet fulfilled. CASE shows signs of being able to solve real problems, but the baggage of the past continues to get in its way. MIS needs to recognize not just what CASE can do, but what it cannot do yet.

New projects. CASE is good at starting from scratch. Most CASE tools accept input only from the workstation in graphical or textual form.

Some of the tools available even go beyond the analysis and design stage, showing how brand new data bases, and even parts of applications, can be generated automatically from such high-level constructs.

Unfortunately, most MIS shops, unless they are making a key decision about a new data base management system, for example, do not spend much time on completely new projects. Analysts and programmers spend up to 80% of their time maintaining and enhancing existing systems.

These tasks must be addressed by personal computer graphics technology. And that is a difficult job — especially when dealing with complex navigational data base access and unstructured program logic. However, unless PC graphics supports maintenance and enhancement, it is a novelty and only intermittently useful.

HAL MAYFORTH

Also, no mechanisms currently exist by which data and logic constructs can be transformed into graphical objects, reorganized and extended by an analyst, checked for integrity and then resubmitted to the host dictionary and library environments.

So MIS will resist CASE until it can help more extensively with existing systems or until MIS has an additional incentive for building new application systems.

Methodology. CASE, by its name, denotes software engineering. Software engineering implies discipline, yet most MIS shops do not follow methodologies rigorously — partly because of the immature and constantly changing nature of the field.

Those MIS shops may have mixed and matched pieces from different methodologies to create their own customized approach, but even these methods are not employed with fidelity.

MIS's attempts at discipline are further confused by a continued lack of information or by misinformation. A well-known rule of automation states that you should only automate what is well organized and understood in the first place.

The little that is actually written about software engineering pays inadequate homage to the role of data — especially relational data base — in the design and implementation of cost-effective systems.

Some CASE tools that espouse a "cradle-to-grave" methodology have enjoyed great success in those few installations whose champions are strongly committed to that particular discipline.

But maybe the world at large is not ready to take software and information engineering quite that seriously.

The point is, neither mix-and-match flexibility in a CASE tool nor strict methodology can be sacrificed. Requiring flexibility in a CASE tool is understandable and defensible if your demand is for the ability to select different methodologies and techniques. But the ins and outs of CASE tools should not delay or thwart the necessary decision to impose discipline on the process.

Shared capabilities. Those CASE tools that are limited to individual use — or consecutive use by team members — may provide certain benefits for communication but will enjoy restricted influence and exposure. Unless the ability to manage shared activities is provided and the integrity of the models and diagrams on which a project team is working is ensured, PC-based CASE software will rapidly turn into shelfware.

The CASE tools that will gain commitment and success from end users are those that have an active, central dictionary to control the check-in/check-out of modules and information and those that can easily integrate updates to that repository of business rules and processes.

Neither feature necessarily requires a mainframe solution.

Other configurations, such as a local-area network or a minicomputer, can be used successfully.

Mainframe integration. Most complex applications developed using CASE will end up running on a mainframe.

By mainframe, I mean IBM 3270-based on-line transaction processing — in the IBM world — and not just batch processing.

You could argue that 3270-

Percy is vice-president of strategy for Applied Data Research, Inc. in Princeton, N.J.

- **Warning: New projects only**
- **CASE as a strict disciplinarian**
- **Still a wait for truly automatic programming**

based systems will be replaced by systems where the intelligent workstation is the medium of access, and that is, in fact, IBM's goal with its Systems Application Architecture. But the truth is that for some years yet, we shall still be building applications for dumb terminals.

Thus the target for the delivery of CASE systems is a completely different environment as far as devices, standards, data format, interfaces and procedures are concerned.

Until there is an easier convergence of the two worlds and a more facile management of traffic between the two environments, CASE likewise runs the risk of remaining experimental. It can learn much from the techniques implicit in many fourth-generation technologies, such as active data dictionaries, in administering and managing complex data bases and in application environments.

THE CASE TOOLS that will gain commitment and success from end users are those that can easily integrate updates.

State of the art. CASE is still an evolving technology. Many users are gaining valuable experience and benefits from its new methods of communicating.

But there remains much to learn about the new levels of abstraction by which we might define objects of interest to our businesses and the processes that pertain to those objects.

Researchers are exploring how to represent, in conventional hardware and software architectures, the constructs and semantic rules that govern the important entities in business. How can we simplify our concepts without reducing the infinite variety of choices and colorings implicit in our business applications to a complex range of defaults? When will the innovations surrounding object-oriented data base and programming systems consolidate on a recognizably sound platform like the relational model?

The fact is, we are fairly well advanced in representing the data side of the equation — and all its mutual relationships — in graphical form, with some establishment of a rule-base underneath.

But the process side is less well understood. Process, far less stable than data, is affected more by transient issues such as telecommunications speeds and output devices. The day when MIS can generate complex applications without some procedural code is not yet here.

Standards. CASE is innovative; standards are conservative. Innovation is glitzy and exciting; standards are dull and slow moving. The industry wavers between the two, since users are unsure of the degree of standardization they want and are wary of staying in a backwater if they behave too cautiously. In the wake of SQL, end users seem to be demanding greater interchangeability between heterogeneous platforms or products.

Standardization efforts, such as the ANSI X3H4 committee's debate between its IRDS standard and the International Standards Organization standard, are extremely well intentioned. The Information Resource Dictionary System (IRDS), under development since 1983, is a fully extensible dictionary to define and manage information objects and resources used by software developers during the application development process.

Another effort, the electronic design interchange — commonly known as EDI — format, is being championed as a proven standard in the computer-assisted engineering area for exchanging information between different CASE products.

We should attempt to standardize only what we understand well. So the CASE market may remain slow until such standards are articulated, reviewed and understood by the vendor and end-user communities.

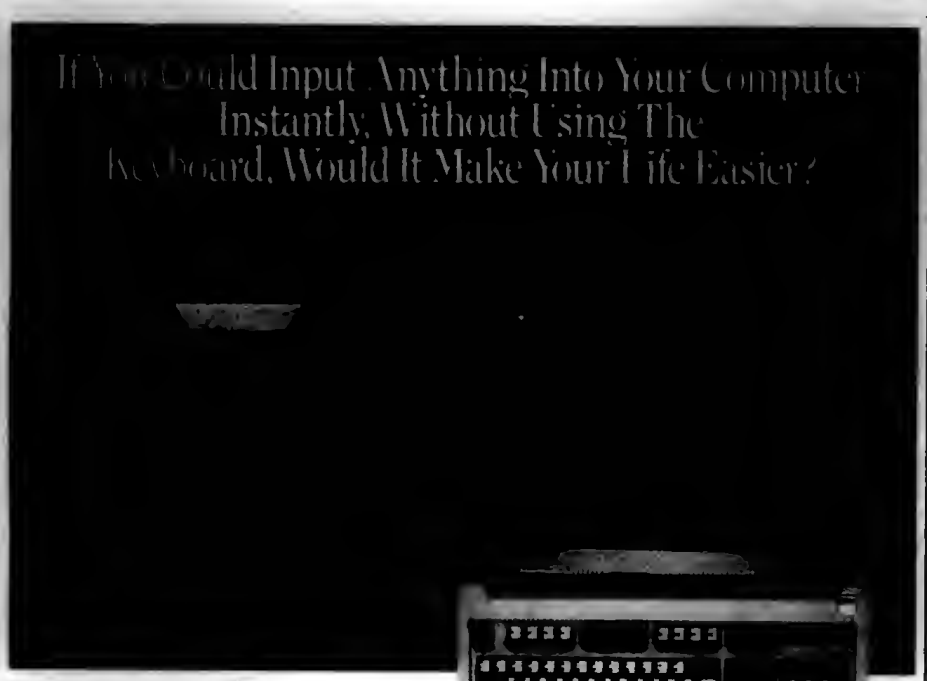
Timing is everything

CASE has started quickly, as far as placement of relatively cheap units are concerned, and its long-term success is certain. The timing of this greater commitment seems to be dependent on some other stimuli, such as a breakthrough in technology.

Maybe CASE needs more success stories from the methodologically purer organizations that regularly deliver and maintain major applications. Success stories of simple systems where complete code has been generated from design constructs would be welcome as well. Maybe CASE needs another market shaker to encourage the development of a new set of applications with necessarily new techniques. That shaker could well be relational data base for complex systems.

The success of IBM's DB2 and other SQL-based systems in the IBM arena suggest that now is the time for organizations to make a break from the clutter of the past. Users are moving to radically new ways of analyzing the meaning of data, defining it according to relational rules and accessing it at abstract, set-oriented, value-driven levels.

The commitment to making shared relational data base happen will require cultural, organizational and methodological changes in corporations. CASE and SQL could become excellent partners in forcing MIS departments to face up to that change and thus effectuate a further stage of maturity in information resource management. •



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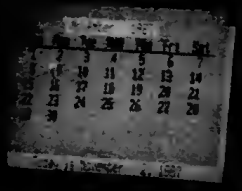

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Penney

FROM PAGE 1

the replacement of cash registers with point-of-sale (POS) systems and the construction of one of the most extensive IBM Systems Network Architecture (SNA) networks in operation. This information artery carries credit authorization, POS data and catalog sales transactions for some 180,000 employees.

But the nation's fourth largest retailer was not content to stop there. For example, J. C. Penney is a trendsetter in electronic document interchange (EDI) and merchandising via satellite broadcasting.

"When you talk about retail companies on the leading edge of technology, you have to start with J. C. Penney," says Nicholas Gallupo, a partner at Arthur Andersen & Co.

Penney's use of technology clearly reflects its corporate culture. In the last 20 years, a succession of insightful chairmen have carefully translated technological innovation into competitive advantage, according to outside and inside observers. "Over the years, management provided the leadership — and the dollar investment — to make [technology] work," stresses Robert Capone, who headed the company's MIS function for 19 years before retiring in April. "It was considered a search for excellence."

The company says it believes it can hold up tangible proof of technology's contribution to the bottom line. From 1974 through 1984, J. C. Penney invested heavily in its POS and credit authorization system. As investment in technology increased, so did sales per employee, Evans says. "You can't just credit technology, but it had an impact," he maintains.

Except for a dip during a sales slowdown in 1984 and 1985, Penney has shown steadily increasing net profits in recent years, climbing from $467 million in 1983 to $608 million in 1987. In the Forbes 500 listing, J. C. Penney ranks second among department stores in sales per employee.

Moreover, Penney's commitment to technology has enabled it to build a quality MIS staff. It promotes heavily from within and assigns innovative and challenging projects to its people, Evans asserts. Penney is consistently listed among the 100 best companies to work for in America, and its corporate MIS staff reflects this — most have been with the company for two decades. Continuity breeds success, J. C. Penney's MIS executives contend.

Yet the company's success is more the result of executing fundamentals than anything else. "We give end users the tools to go to bat with. All we do is keep up with their requirements," Evans declares.

All end-user departments' five-year plans not only include revenue and profit projections but emphasize systems requirements. "At one time, systems told us what we needed, but now we tell them what we need," says Rod Birkins, president of Penney's catalog division. "It makes for a compatible relationship that effectively contributes to our growth."

Former MIS chief Capone

MIS representatives provide technical backup for end users when project funding is requested and also participates in steering committee meetings with users to define a project's scope and calculate costs and benefits. MIS then schedules quarterly meetings to keep tabs on projects.

Leaner and meaner is the rule in the systems department, which has reduced its head count from 2,300 to 1,900 during the last few years as it automated operations functions. Moreover, it is dropping 19 of its 45 IBM mainframes. Twenty-four older Model 3033s and 4381s, which do not support IBM's MVS/XA operating system, are being phased out; five will be replaced by larger IBM machines.

Reducing the number of mainframes will not only save money but will provide greater processing capacity because of the upgrades, Evans claims. The upgrades also position Penney to take advantage of the increased memory addressability of IBM's MVS/ESA when it becomes available this summer, he adds.

J. C. Penney has further honed its information strategy in several ways, including the following:

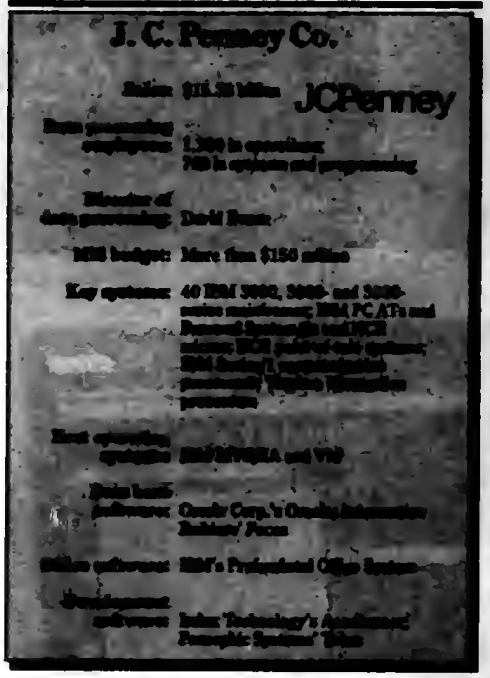
The network. Perhaps no company better illustrates the adage that "the network is the computer." J. C. Penney was one of the earliest adopters of a full-fledged SNA backbone network and remains a staunch believer in distributed processing. "Our strategy is to locate your department wherever you want, and we'll provide the computer services from where it makes the most sense," notes John Dratch, director of DP and technical support.

Penney's SNA network connects 2,000 facilities with seven regional data centers. It is the pipeline that carries credit authorization requests for the company's 1,800 stores; moves data collected on POS systems and from catalog orders to and from the data centers; and provides access to a variety of corporate information and services ranging from stock quote data and IBM's Professional Office System office automation software — which has 35,000 users — to development tools.

The network was conceived to operate as a utility, Dratch recalls; plug in a terminal or microcomputer at any point on the network, turn it on and go. "It's like flipping a switch and the light goes on," he says.

The company's three larger

At A Glance



CW CHART

Manhattan-worn Penney heads west

BY SHARON BAKER
CW STAFF

Once J. C. Penney Co. made up its mind, there was no stopping it.

Although moving its headquarters from the Big Apple to the Lone Star State cost the company most of its nonmanagement employees and half of its management staff, company officials say leaving the skyrocketing prices of Manhattan for the Dallas suburb of Plano, Texas, should save between $60 million and $70 million a year. The move began in January and should be completed by the end of this month.

David Evans, vice-president of systems and data processing, says he sees the move as a "50-year decision," in part because it let the company replace outdated information technology.

Even a company of Penney's size and reputation — it was listed in *The 100 Best Companies to Work for in America* — must work hard to entice employees to follow it halfway across the country. How does it do that? And what does it do about those unwilling to leave familiar surroundings?

After Penney announced its intention to move, its 3,800 New York employees were forced to re-evaluate their career plans. J. C. Penney officials claim that roughly 50% of its 2,200 management employees followed the company to Plano, where Penney has maintained a data center since the early 1980s. About 90% of the corporate MIS staff moved, as did about half the 75 systems development group employees.

Two top managers who stayed behind for personal reasons are William Friel, vice-president and director of systems and data processing, and Evans' predecessor Robert Capone.

Penney officials said most positions left empty by those unwilling to make the move are now filled. The Dallas area is ripe with workers left jobless by the oil glut.

The company also relied on ties with local colleges to fill entry-level positions and start rebuilding a loyal work force.

Although the move did not significantly affect J. C. Penney's MIS operations — that department had relocated to Texas around 1980 — the company took the opportunity to do some housecleaning. Typewriters and a melange of disparate word processors were thrown out and replaced with personal computers, and buildings were connected by IBM Token-Ring networks and fiber-optic links.

The relocation "gave us a unique opportunity to go in and redo our headquarters physically and in terms of operations," Evans says.

To prepare employees for the move south, the company set up a Texas Information Center in its New York offices. The center served as a communications vehicle for those interested in learning about life in Texas, according to Gerry Montgomery, J. C. Penney's director of personnel administration.

"There was information [at the center] on almost almost every conceivable personal activity relating to the move, including schools, churches and housing," Montgomery says.

Employees who chose to leave Penney and remain in New York were not neglected. The company conducted seminars on how to prepare resumes, write cover letters and perform in job interviews.

Staff members who moved to Texas face still another move within Plano in about five years, when construction on a campus-style company complex, now in the design phase, is completed.

Baker is a *Computerworld* copy editor.

data centers — located in Reno, Nev., Lenexa, Kan., and Columbus, Ohio — handle credit authorization, catalog and store processing. Data centers in Milwaukee and Atlanta support catalog distribution centers, while the data center in Dallas is used for systems development and other corporate processing purposes, such as personnel and accounting. A data center in Westerville, Ohio, handles processing for an insurance subsidiary.

A 56K bit/sec. land line connects all the data centers, but the company leases satellite circuits for backup. Each data center is equipped with IBM front-end communications processors. Each store attaches to the network via an IBM Series/1 minicomputer.

The network handles 350 million credit authorization transactions a year — 186 per second during peak times — as 52% of the purchases made at J. C. Penney involve charge cards. It also handles some 300 million transactions a year generated by outside concerns through subsidiary J. C. Penney Systems Services, Inc., Dratch says.

Thirteen Tandem Computers, Inc. TXP-class systems operate in each of Penney's three credit authorization data centers and act as gateways to credit card company and bank data centers to authorize credit or charge purchases, Dratch says.

The MIS department developed security software to guard access to the network and built a menu-driven user interface — replete with access to stock quote data — to help novice and sophisticated users alike navigate their way through the network, Dratch says.

POS systems. Since 1981, J. C. Penney has kept a close tab on every tie and tool on the shelves of each store with the use of optical character recognition scanners.

Before an item is displayed, a tag is affixed that contains machine-readable information with details ranging from its price and the store in which it was sold to its color and size. During checkout, the sales clerk runs a wand scanner attached to an NCR Corp. cash register over the tag to pick up the information, which is then forwarded to a Series/1.

At the end of each day, the information is compiled and transmitted over the network to the closest of the three major data centers. The information is compiled overnight on IBM host processors, and records of each store's sales are returned within 24 hours of when the files are received. The figures can be interpolated to unearth local and regional sales trends.

"It really smooths the product purchasing decision-making process," says Gerry Monday, manager of corporate services, systems and data processing. "We can spot danger merchandise and hot sellers and react to both a lot faster — by either liquidating or reordering.

"Lag time is critical. If you let it run too long before you reorder, you lose. It doesn't do much good to get a hot-selling swimming suit in late August," he adds. The system also allows the redistribution of merchandise at the warehouse level. For example, shipments of air conditioners bound for a chilly New England can quickly be reassigned to a steamy Atlanta.

EDI. J. C. Penney relies heavily on EDI technology to maintain a flow of merchandise and keep costs down. Roughly 200 of the company's largest suppliers dial into its system each night and access orders.

As a trailblazer in the field, J. C. Penney devised its own EDI approach in the early 1980s. Penney still hands out its EDI manual to suppliers, although the company vows to adopt an upcoming ANSI standard. "It will allow us to get more suppliers on the automated system," Evans says.

Although Evans will not pin down how much money is saved through EDI, he points to the elimination of certain manual tasks, such as relaying order data, stuffing envelopes and postage, as areas where tremendous time and money is saved.

J. C. Penney also looks forward to adding upcoming EDI functionality, such as electronic payment, as standards emerge. EDI is a cornerstone of the firm's information strategy. "We've learned how to network within our own company over the last 10 years. Now it's time to learn how to network between companies," Evans quips.

Corporate TV. J. C. Penney keeps open the lines of communication between its corporate and store buyers with what may be the largest business television network of any U.S. retailer.

Several months before seasonal fashions reach the racks, corporate buyers fan out into the marketplace to select their lines. Once warehouses are stocked, corporate buyers book time at one of the firm's three studios in Dallas for a satellite-based broadcast of their selections to store buyers at 300 sites.

"It's a typical live-action TV broadcast running anywhere from a few hours to the whole day," Dratch explains. "The corporate buyers describe and demonstrate their selections to the store merchandisers, who are ultimately responsible for what items will be carried and in what quantities in each store."

The store buyers use a computer program to select the merchandise they want in their store and enter their order, and corporatewide tabulations for each item are made.

Although buyers take up the lion's share of the network's time — they average 160 broadcast days a year — the network is also used for training and companywide announcements.

Strategic applications. J. C. Penney is testing bar-code technology in inventory control. Under a joint experiment, about 80% of merchandise supplied by Levi Strauss & Co. comes in boxes containing detailed information on premarked labels. The labels are scanned on receipt, and the data is stored in a dedicated system. This automates invoicing and helps the catalog division monitor inventory and sales trends, Evans says.

MIS is evaluating expert systems technology, although managers remain skeptical. "It's still viewed as a solution in a search of a problem," Evans adds.

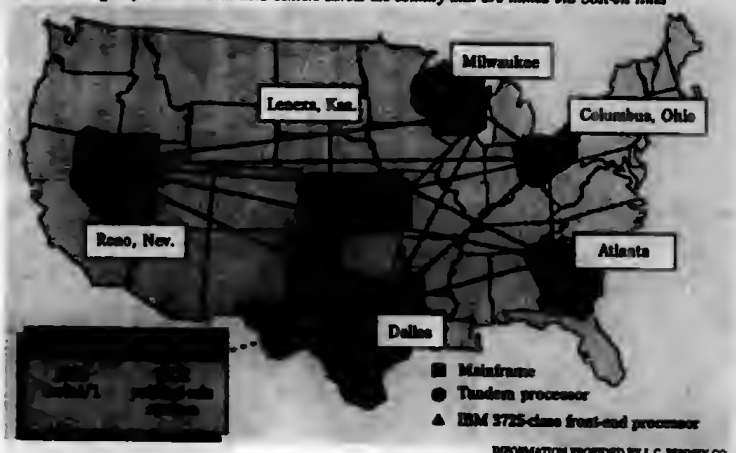
One application where an expert system could come in handy is in the catalog telemarketing sector. The company employs 4,000 telemarketing operators at 14 centers throughout the country, and peak telephone traffic is frenetic. An expert system could be used to direct calls coming in on 800 numbers from busy operators to inactive operators based on caller Zip codes.

Software development. MIS is modifying what Evans calls its earlier "moon-launch" application development methodology — an allusion to the U.S.'s spare-no-expense effort to put a man on the moon during the 1960s — in favor of a flexible approach that allows developers to tailor their efforts to the project. For example, MIS will do prototyping only where it makes sense, such as in large projects, but accelerate programming where full documentation is not needed, says Dick Skinner, systems and programming director.

"We found that our method-

Nationwide net helps J. C. Penney earn dollars

Stores exchange information with data centers across the country that are linked via 56K-bit lines



INFORMATION PROVIDED BY J. C. PENNEY CO.
CW CHART: AMY J. SWANSON

Dick Skinner, *Penney's systems and programming director*

Another Penney

J. C. Penney Co. may be best known as a retailer, but during the last few years, the company has also become one of the world's largest suppliers of computing services.

In 1983, the company established J. C. Penney Systems Services, Inc. to sell credit card authorization and other processing services to outside companies. The idea was to capitalize on an expected boom in the computing services business by leveraging the investment made in its IBM Systems Network Architecture.

The operation's growth has met projections, according to Robert Mooney, the subsidiary's president. Major customers include petroleum companies Shell Oil Co. and Mobil Oil Corp., Zale Corp., First Security Bank in Salt Lake City and Zions First National Bank, also in Salt Lake City.

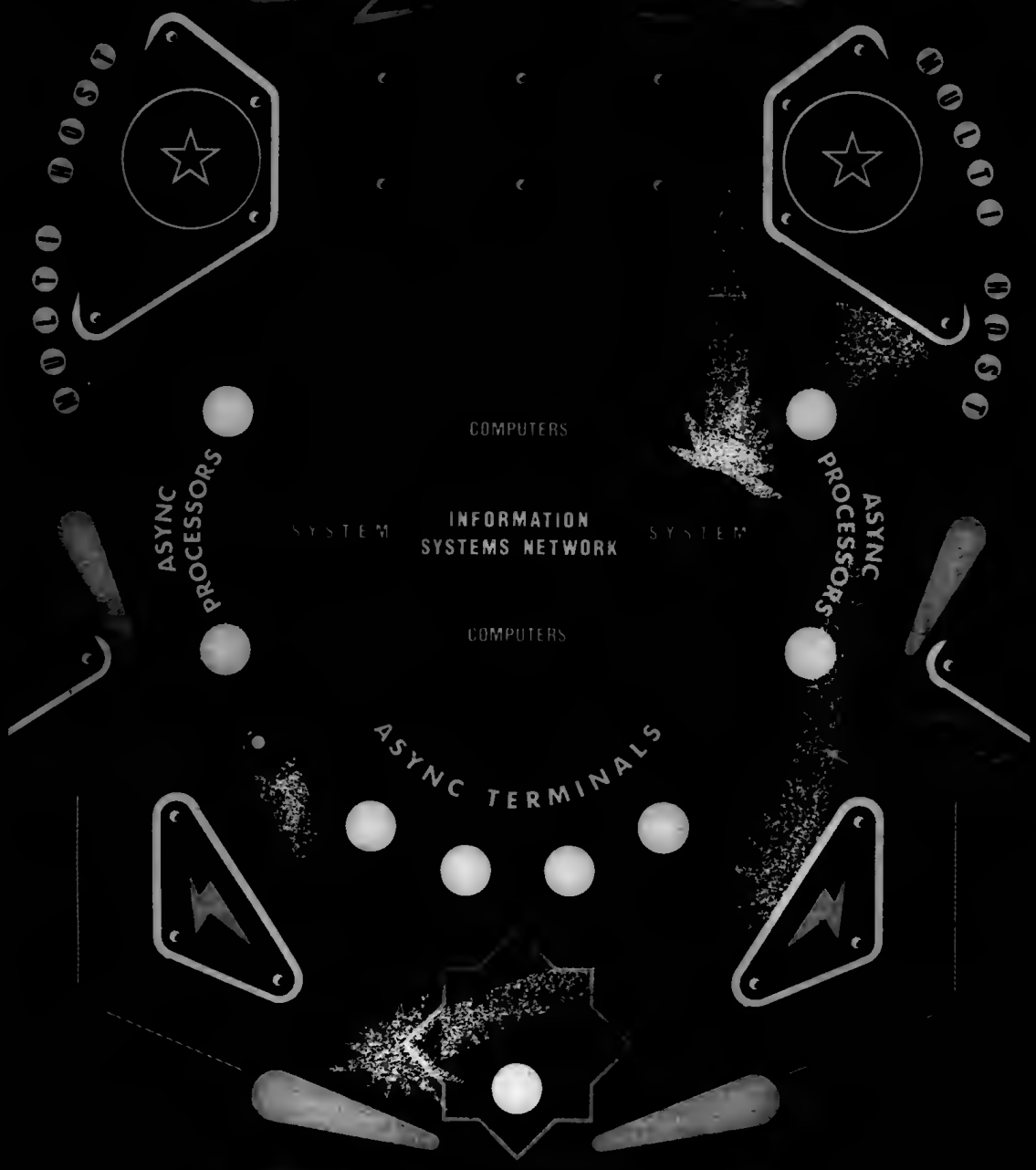
The functions Penney Systems Services provides include authorization for customers' proprietary credit cards plus Visa, Mastercard, American Express Co., debit cards and checks. Some corporate customers also rely on Penney Systems Services for more extensive work, such as bill processing and electronic messaging services.

Customers access the network by dialing in or by installing a dedicated line to an IBM Series/1 processor at a Penney store nearest to them. The Series/1 relays the request to one of three data centers that handle geographically specific credit authorization on the network.

After collecting transaction data on its own computers, the subsidiary transmits it either to a bank for settlement or to the customer's credit card processing center via Tandem Computers, Inc. processors.

ALAN ALPER

CONNECTIVITY



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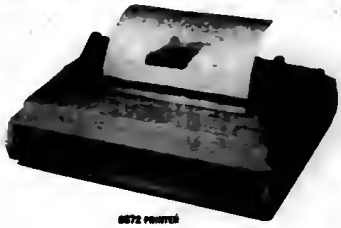

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The right choice.

ology was good for larger systems but required too much overhead for smaller projects," Skinner explains. Penney's prototyping has minimized development goofs. Former MIS director Capone, however, remembers an employee-record data base optimized for on-line transactions that had to be scrapped a few years ago because it could not operate efficiently during overnight batch processing. "It had the wrong emphasis, so we had to go back to the drawing board," he recalls. "We never had a systems fiasco, though, where we spent millions of dollars and had to scrap the project."

The department is doing more programming on PCs and less on IBM 3270-type terminals. For large projects, the department is experimenting with front-end computer-aided software engineering tools, such as Index Technology Corp.'s Excelerator. On the back end, Pansophic Systems, Inc.'s Telon is sometimes used to automate code generation, Skinner adds.

The department keeps up with programming demands because it only develops "mission-critical" systems. Less complicated projects are done by end users with off-the-shelf tools. MIS provides SAS Institute, Inc.'s statistical analysis programs and Information Builders, Inc.'s fourth-generation language, Focus, to let end users build applications, make queries and create reports from the data base in Dallas, which resides on an IBM 3090 running IBM VM.

Skinner says some departments are developing their own applications while others are just catching on. "Our controller generates his own reports, and the credit department does all its own analytic work in making changes in credit policy. Other departments need to do more work," he says.

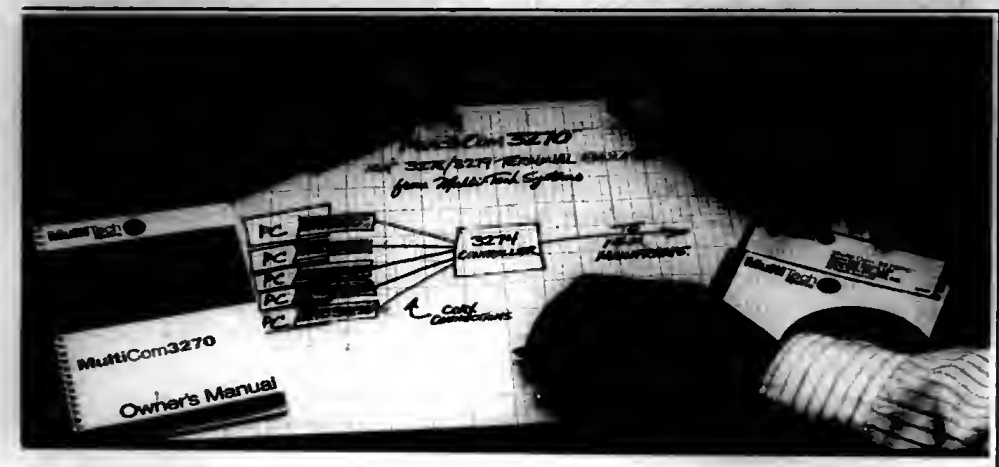
Productivity Center. J. C. Penney wants to cultivate a user base that is as sophisticated as its systems. The MIS department has set up a room that serves as a problem solving center for confused PC users and a place where employees can tinker with new machines and packages. "It's basically a walk-in computer store," Evans says. "We've got six or eight PCs running in there, and we encourage people to simply come in and experiment."

> THE Productivity Center "is basically a walk-in computer store. We encourage people to simply come in and experiment."
>
> DAVID EVANS
> J. C. PENNEY CO.

Staffers assist employees in trying out new packages or updated versions of old favorites. The company's productivity credo dictates that it is the results that count, not the road you take to get there.

"Our employees can use any kind of PC they want," Evans adds. "We don't even care what software packages they use. We've got a corporate license for Supercalc, Supercalc IV and Wordperfect, but if they're comfortable with another, that's fine."

Penney also tried to circumvent possible PC phobia by switching the room's name from the Information Center to the Productivity Center. "We wanted the focus to be that the boxes make the people more productive, not just 'everyone else has got a computer, so I want one, too,'" Monday concludes. •



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MANAGEMENT

TAKING CHARGE

William S. Galkin

Untangling owner's rights

Who owns the software developed by a consultant — the consultant or the company hiring the consultant?

The answer is uncertain, and consultants and companies hiring them need to be aware of such uncertainties to establish and protect their ownership rights.

The determination of software ownership lies in the murky waters of the work-for-hire doctrine of the Copyright Act of 1976. The doctrine states that if consultants are employees of a company, then the software they develop is automatically owned by the company.

However, if consultants are not employees, then they will own the software, unless they sign a work-for-hire agreement containing special language and the software falls into one of these work-for-hire categories: A contribution to a collective work, a part of a motion picture or other audiovisual work, a translation, a supplementary work, a compilation, an instructional text, a test, answer material for a test or an atlas.

There are two causes of uncertainty under the Copyright

Continued on page 70

Texaco tests lights-out data center operations

BY JEAN S. BOZMAN
CW STAFF

HOUSTON — With the belief that much of its IBM 3090 operations can be automated, Texaco, Inc. is moving toward lights-out operations at twin data processing centers here and in Tulsa, Okla.

An automation system called OPS/MVS from MVS Software, Inc., a start-up firm helped by Texaco, will be tested on weekends beginning this month. During the trials, Tulsa and Houston will take turns running both centers' IBM 3090 systems. The goals are to make such weekend remote operations routine and to spread the use of OPS/MVS to other Texaco 3090 mainframe centers in Toronto and London, with some operators being moved into other functions.

"The majority of normal activities associated with keeping our systems up and running would be handled automatically by stored procedures," said Ed McDonald, division manager of information processing at Texaco. Under OPS/MVS, the current operators have stored "rules" explaining what they would do when confronted with specific messages. The rules have been blended with OPS/MVS code that filters the IBM MVS messages requiring human intervention.

Automating MVS operations does not mean the elimination of

Continued on page 71

Data View

It's a risky business for CIOs

A survey of 346 chief information officers shows they face a greater risk of dismissal than other MIS staff, especially during mergers

INFORMATION PROVIDED BY TOUCHE ROSS & CO.
CW CHART

Uniting DEC, IBM

Nuclear site MIS chiefs wired for fusion effort

BY CHARLES BABCOCK
CW STAFF

AIKEN, S.C. — The Savannah River Plant of the U.S. Department of Energy is a sprawling, 300-square-mile facility with a research laboratory, plutonium and tritium processing facilities, two active nuclear reactors and 5,000 white-collar information workers among its 16,000-member work force.

As such, it presents special challenges to an MIS staff, particularly for the integration of Digital Equipment Corp. and IBM hardware. That integration is being driven by grass-roots user demands to tie workstations into centralized computers via Ethernet networks.

Three IBM mainframes form the backbone of data processing at the site, but they are supplemented by 100 DEC VAXs and Microvaxes, 1,400 IBM 3270 terminals, 2,000 IBM Personal Computers and 1,500 Apple Computer, Inc. Macintoshes. The plant also has a Scientific Computer Systems Corp. supercomputer that will be upgraded later this year for special scientific applications.

Tying in

The task of linking this mixed hardware together has fallen to the 50-member Computer Projects Department, created in 1985 when the site was limited to the three mainframes, 1,000 PCs and a few dozen VAXs. The two people most frequently mentioned as originators of the network are the department's chief technologist, Andrew J. Johnson, 42, and its superintendent, Gerald P. Thompson, 45. Neither arrived in Aiken prepared for the job.

As a matter of fact, as Johnson set up the first Ethernet network in the Savannah River Laboratory and then began setting up nine other Ethernet LANs and linking them together, the site became a regular stopover for DEC and its prime Ethernet prospects. "What we were doing hadn't been done anywhere else before. There just wasn't a market for 300-square-mile networking solutions," Johnson says with his wry humor.

"Right now, much of the data is in Adabas on the mainframe," Thompson says, referring to the

Continued on page 72

PROFILE

Gerald P. Thompson

Position: Superintendent, Computer Projects Department, U.S. DOE Savannah River Plant.

Mission: To bridge the worlds of IBM and DEC for more than 5,000 computer users.

System failings hit bottom lines

BY ALAN ALPER
CW STAFF

NEW YORK — Despite heightened awareness of computer security, a significant percentage of organizations are experiencing financial losses due to poor contingency planning and practices, according to a recent survey.

The survey, conducted by consulting firm Ernst & Whinney, revealed that one-third of the 390 organizations polled have suffered some financial loss during the last two years. Twenty-two percent of the firms reporting financial losses cited breaches of computer security; 47% and 31%, respectively, blamed system failures and downtime or fraud and embezzlement.

Of firms that reported losses due to security deficiencies and fraud, 18% reported losses of less than $50,000, 11% claimed losses of $50,000 to $1 million and 2% acknowledged losses in excess of $1 million.

Twenty-six percent blamed losses of $50,000 or less on system failures, and 9% estimated losses at between $50,000 and $1 million. While financial losses related to system failure or downtime reflect deficient business continuity planning, only 20% of those polled said such planning is done regularly and thoroughly tested for all organizational units. Forty percent said this kind of planning is limited to critical services, such as data processing, and another 40% said the procedure is limited to DP, is irregular or is done only on a best-effort basis.

Ernst & Whinney pointed out that computer security is an issue that should not be limited to DP managers or departments, but should be handled as any topic of concern to general management.

Half the respondents — representing a nationwide cross-section of commercial and government DP professionals — said security risks have accelerated during the last five years; one-third said risks have decreased. Many said risks accelerated in proportion to increased amounts of computing. One-fourth said risks were rising at a faster rate than increases in computing, but a similar number said the opposite.

Worries

Corporate DP respondents cited competitors as a major concern, while government organizations pointed accusatory fingers at foreign governments. Respondents reiterated statements made in past surveys that protecting data from their own employees is also a chief concern.

More than half the respondents said all data is classified by written agreement or that classification covers specific applications and media. Many organizations, however, only use data classification on an ad hoc basis or not at all, the report noted. More than half the respondents claimed to use data encryption on a selected or experimental basis. Very few said all confidential data is encrypted, while, to the chagrin of Ernst & Whinney officials, many were not aware of secret coding at all.

Overall, the survey results suggested that internal practices for protecting computer data continue to improve as organizations adopt more consistent policies and procedures. Unfortunately, security methods that employ one-time passwords supported by see-through architectures and smart cards — as well as data encryption and codes — are only beginning to be effectively used, the Ernst & Whinney report concluded.

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Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

MANAGEMENT BRIEFS

Common to tackle insurance issues

Common, the users group made up of IBM minicomputer users, recently launched a project to address insurance industry issues. The project, which is headed by Sandra S. Nelson of Harden & Co. in Concord, Calif., will focus on trends in areas such as computer output and source-document microfiche, electronic filing with the Internal Revenue Service and laser printer forms.

The Association for Systems Management has announced its 1988-89 professional education calendar, which features a new hands-on expert systems program. Other seminars focus on basic systems analysis, advanced systems analysis, computer-assisted software engineering and desktop publishing. The multiday sessions will be presented throughout the U.S. and Canada between now and mid-1989.

The Computer and Business Equipment Manufacturers Association, or CBEMA, recently released a guide to the standards for human-factors engineering in VDT workstations. The CBEMA guide outlines voluntary specifications for VDTs, furniture and environmental factors such as lighting.

Consulting firm **Nolan, Norton & Co.** has announced the Nolan Norton Institute, which is intended to help companies understand the use and management of information technology as a competitive tool. The institute will organize centers for industries, technology management and international studies, with an initial focus on the banking, finance, health care, insurance and manufacturing arenas.

Computer Channel, Inc., a Floral Park, N.Y., company that plans computer-related educational telecasts, recently signed agreements with the Gartner Group, Inc. and Dataquest, Inc. market research firms and *Network World* newspaper to jointly produce programming for a fall debut.

Calls for papers have been issued for various conferences. Papers for the **Association for Computing Machinery** (ACM) 1989 Sigmetrics and Performance conference May 23-26 in Berkeley, Calif., can be sent to Alan Jay Smith, Computer Science Division, University of California, Berkeley, Calif. 94720.

ACM and the **IEEE Computer Society** are seeking industry-oriented papers for the Symposium on Computer Architecture, which will be held May 28-June 1, 1989 in Jerusalem. Authors can write to Arvind, Laboratory for Computer Science, MIT, 545 Technology Square, Cambridge, Mass. 02139.

The Association for Systems Management is soliciting papers for its annual Information Systems Conference, scheduled for May 7-10, 1989 in Dallas. Inquiries can be sent to Richard McCaffrey, assistant executive director, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

LOCAL HAPPENINGS

NORTHEAST

Newton, Mass. June 28. Association for Women in Computing Greater Boston Chapter. Planning 1988-89. Days Inn. Contact: Sandra Mitchell, 18 Reynolds Ave., Natick, Mass. 01760.

WEST

San Francisco. July 6. Association for Women in Computing Bay Area Chapter. "Unix." Stagecoach Restaurant. Contact: Association for Women in Computing, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

Phoenix. July 12. Independent Computer Consultants Association Phoenix Chapter. "WORM Disk Laser Technology." Phoenix Sheraton, First St. and Adams. Contact: ICCA, PO Box 32115, Phoenix, Ariz. 85064.

San Diego. Nov. 17-18. California Educational Computing Consortium Western Educational Computing Conference. Contact: Judith Rosenwald, Extended Education, NAD 153, San Francisco State University, 1600 Holloway, San Francisco, Calif. 94132.

MIDWEST

Grand Rapids, Mich. Sept. 11-13. Midwest Data Base and Data Communications User Group annual conference. Amway Grand Plaza Hotel. Contact: Theodore F. Rock, Harris Trust and Savings Bank, P.O. Box 755, Chicago, Ill. 60690.

SOUTHEAST

Atlanta. Sept. 12-14. Southeastern Telecommunications Association: Positioning for Success. Marriott Marquis. Contact: Carlisle Rennes, SETA Public Relations, P.O. Box 210156, Columbia, S.C. 29221

MIDDLE ATLANTIC

Bethesda, Md. June 28. Capital PC User Group AT&T PC6300 Special Interest Group. Lippett Auditorium, National Institutes of Health. Contact: Capital PC User Group, Inc., 51 Monroe St., Plaza East Two, Rockville, Md. 20850.

Tysons's Corner, Va. June 27-30. Washington Ada Symposium. Sheraton Premiere Hotel. Contact: Helen Gill, Mitre Corp., 7525 Colshire Dr., McLean, Va. 22102.

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Galkin

CONTINUED FROM PAGE 67

Act concerning who owns software developed by a consultant. The first is that the courts disagree on who is an "employee" under the Copyright Act. The second is that it is unclear whether software falls into one of the work-for-hire categories.

Nevertheless, there is one certainty: If consultants decide to abandon their independence in favor of working 9 to 5 as a traditional employee, the software they develop will be owned lock, stock and barrel by the company hiring them. However, the ownership issues become murky when we confront a consultant who is not a traditional employee.

The following are two leading theories of who is considered an employee under the Copyright Act; each poses its own problems for consultants and the companies hiring them:

- The Control Theory. Under the theory set forth in 1984 in *Aldon Accessories Ltd.* v. *Spiegel, Inc.*, if a company exercises sufficient control and supervision over a consultant during the development of software, then the consultant is an employee and the software is owned by the company. However, if the company does not exercise sufficient control and supervision, then the consultant owns the software, unless the consultant signs a work-for-hire agreement and the software falls into one of the work-for-hire categories. Unfortunately, the court guidelines are vague as to how much is sufficient actual control.
- The Agent Theory. Under the theory set forth last year in *Easter Seal Society for Crippled Children and Adults* v. *Playboy Enterprises*, if a consultant is a company's "agent," then the consultant is an employee and the work is automatically owned by the company. Otherwise, the work is owned by the consultant, unless he signs a work-for-hire agreement and the software falls into one of the work-for-hire categories.

In practice, the Agent Theory is complicated and, therefore, difficult for a consultant and company to apply to assess their ownership rights. The complications arise because there are numerous criteria necessary to determine whether a consultant is a company's agent.

The principal criteria a court will look for are the following: whether a company has the right, though not actually exercised, to control and supervise a consultant; a consultant's level of skill; who supplies the materials; and the method of payment, such as by time spent or by the job.

Work-for-hire categories

Currently, there is little judicial guidance on whether software falls within one of the work-for-hire categories. Legal authorities agree that if the software does not, such an agreement will have no effect and a consultant will own the software regardless of the signed agreement. Conceivably, software may be a contribution to a collective work, a translation, a supplementary work or a compilation. However, the inclusion of software within these categories is far from certain.

> IF CONSULTANTS decide to abandon their independence in favor of working 9 to 5 as a traditional employee, the software they develop will be owned lock, stock and barrel by the company hiring them.

If software does not fall into one of these categories, how can a company be certain it will own the software? One computer-law expert recommends that consultants sign an agreement specifying that if the work-for-hire agreement does not work, then the consultant also assigns all rights to the software to the company.

If the assignment of the consultant's rights is held to be enforceable, then the company will receive fewer rights than it would have received under an enforceable work-for-hire agreement. For example, the term of the copyright may be shorter. But fewer rights under an assignment agreement are certainly better than no right under an unenforceable work-for-hire agreement.

The bottom line

Where do we end up? A company that wants to own the software should have consultants sign work-for-hire agreements that also provide for an assignment of rights. Consultants who want to own the software should enter into a written agreement with the company reserving their rights.

If there is no written agreement between a consultant and a company defining ownership rights, then the consultant and company will be cast deep into the murky waters of the work-for-hire doctrine.

In that case, the advice is to establish as many of the necessary criteria as possible under the Control and Agent Theories and hope for the best — or, to put it another way, in a world of legal uncertainties, the best you can do is improve your odds.

Galkin practices computer law in Baltimore with the law firm of Frank, Bernstein, Conaway & Goldman.

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[1]Upgrade offer valid February 17, 1988-July 31, 1988. Proof of purchase required.

Texaco

FROM PAGE 67

all computer operators, McDonald said. Texaco is making the effort to not only reassure the operators that they will not be terminated but also train them on handling end-user queries at the center's help desks.

Typically, there are four to five operators per shift at each site, but during the weekend trials, only one center will be fully staffed. The remote site will still have one or two people to mount tapes and answer phones.

Ten-year plan

Texaco's move toward automation, planned since the mid-1980s (see chart below), is expected to turn the current operations staff into workers with higher skill levels. A 10-year strategy, spanning 1983 to 1993, calls for computer operators with high school degrees to move into positions that now require a college degree in computer science.

"The concept is that it's a job enrichment program," McDonald said. "The jobs are richer jobs. The operators will not be as involved in vigilance as they once were." Since 1984, new hires have been expected to have better academic credentials, and Texaco plans to retrain older workers as help desk consultants and supervisors of automated systems.

"This is not so much a replacement of people as it is a redirection of people," explained Dennis Samoska, assistant manager of computer operations at the Tulsa center. "We want our people to work in a proactive mode, rather than in a reactive mode. We want them to be able to watch a problem develop on screen and to call a user to notify him — even before the user notices the problem."

Texaco's underlying concern is that MVS operations have grown in complexity, requiring operators to watch as many as five consoles at once. "The way it is now, you don't know which terminal to look at first," McDonald said. "Over the years, the number of systems messages has increased almost exponentially. That makes it difficult for operators to determine which messages require action."

Almost human

The OPS/MVS code can do nearly everything a human operator can do, including system IPL, job restart and error detection. Each 3090 has two attached IBM Personal Computer ATs that enable operators to take over the remote 3090 system. Also, cables linking the PC AT's backplane to four separate IBM 3090 consoles give remote operators the feel of standing next to the machine.

The ATs are attached to four 3090 consoles, including an IBM 3092 hardware console, an MVS console, an IBM 3174 controller and a console displaying IBM's Netview, a TSO or an IBM IMS monitor. In addition, Texaco plans to display data from its on-site environmental monitoring systems.

"Unless you're recovering from a power outage, there's no need to mount tapes in order to restart the system," Samoska said. Just in case, there are beepers to alert remote managers in case of emergency.

Still, the task of automating Texaco's large computer rooms is a sizable one. The Houston center houses a 3090 Model 600E and a 3090 Model 200, while the Tulsa center houses a 3090 Model 600E and a 3090 Model 400. Each computer room has 28,000 square feet of raised floor and holds at least 100 disk drives with capacities of 2.5G bytes or more.

"Texaco runs its sites in a way that is absolutely symmetric," said MVS Software Vice-President Jim Woodhill. "They have the same machines running the same software in the same networking configuration so that each site can back up the other." OPS/MVS will take advantage of that symmetry, since operators at both data centers can follow the same procedures to run the remote systems.

Because Texaco computer rooms were a working laboratory for OPS/MVS, Texaco feels it will have an inside edge on lights-out technology. "We've been aware of OPS/MVS for two years now," said Bill Stevens, manager of operations at the Tulsa center. "We were the first test sites, and we gave them some machine time and office space to develop the product."

Apprehension

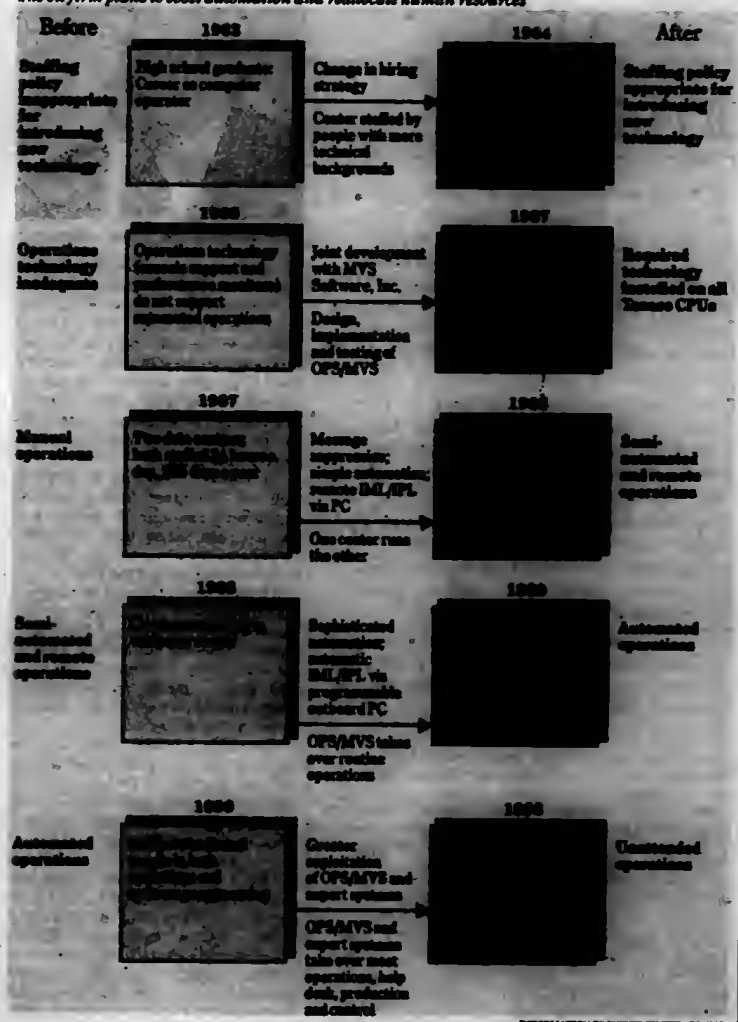
McDonald emphasized that the push to automate preceded Texaco's learning about OPS/MVS. He said the product fit with Texaco's long-term plans but that the plan may someday include other products.

So far, OPS/MVS has yet to be installed widely. The only other large site that has installed it is New York's Chemical Bank, which plans to use the system at multiple sites.

Admittedly, Texaco's operators have been concerned about the move to automated MVS operations. "There's been apprehension, of course, when something comes into the shop that looks like it's going to be able to do their job," Samoska said. "But we tried to put the point across that all we're doing is changing the tools available to the operators."

Texaco outlines its 10-year operations strategy

The oil firm plans to boost automation and reallocate human resources



INFORMATION PROVIDED BY TEXACO, INC.

CALENDAR

[redacted]

SVS Users' Association National Meeting. Chicago, June 26-30 — Contact: Executive Systems Corp., 9442 Capital of Texas Highway N., Arboretum Plaza One, Austin, Texas 78759.

Data Management Division of the Securities Industry Association, presentation on Master Limited Partnerships. New York, June 27 — Contact: Sal M. Cuzzo, DMD Luncheon Committee Chairman, c/o First Manhattan Co., 43 Broadway, 17th Floor, New York, N.Y. 10004.

Assessing Advanced Applications of Diagnostic Expert Systems in Aerospace & Defense Electronics. Los Angeles, June 27-28 — Contact: Conference Administrator, Technology Division, Institute for International Research, 331 Madison Ave., Sixth Floor, New York, N.Y. 10017.

Information Gateways: BOCs, Open Networks and Competition. Washington, D.C., June 27-28 — Contact: Telecom Publishing Group, Attn: Conference Registrar, P.O. Box 1455, Alexandria, Va. 22313-2055.

Systemhouse XVI. New York, June 27-30 — Contact: Association of Information Systems Professionals, 104 Wheat Road, Suite 201, Deerfield, Ill. 60015-5195.

Information Services '88. Atlanta, June 28-30 — Contact: Third Millennium, Inc., 119 Pleasantridge Road, Mount Kisco, N.Y. 10549.

Engineering Workstations Conference. Boston, June 28-30 — Contact: Corporate Expositions, Inc., Box 3727, Santa Monica, Calif. 90403.

Network Management Solutions. Boston, June 28-30 — Contact: Dorothy Fortner, International Data Group Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

Beyond DB2: 3-5 Year Implementation Strategies. Hilton Head, S.C., June 29-30 — Contact: Digital Consulting, Inc., 2 Windsor St., Andover, Mass. 01810.

[redacted]

Technology in Education: Expanding Teacher Effectiveness. Eugene, Ore., July 7-8 — Contact: Technology in Education Conference, University of Oregon Continuing Center, 1553 Moss St., Eugene, Ore. 97403.

[redacted]

International Cost Engineering Congress. New York, July 10-13 — Contact: American Association of Cost Engineers, 308 Monongahela Building, Morgantown, W. Va. 26505-5608.

Commercial Image Processing '88. Boston, July 11-13 — Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038-2786.

Fault Tolerant Computing. Santa Clara, Calif., July 11-13 — Contact: Kevin Fuhlen, University of California Extension, Santa Cruz, Calif. 95064.

National Remotely Computer & Automation Conference. New York, July 11-13 — Contact: National Forum, 333 Sylvan Ave., P.O. Box 1151, Englewood Cliffs, N.J. 07632-0151.

Case '88 International Workshop on Computer-Aided Software Engineering. Cambridge, Mass., July 12-13 — Contact: Pamela Mayer, Index Technology Corp., One Main St., Cambridge, Mass. 02142.

Advanced Computer Networking Solutions. Boston, July 13-15 — Contact: Advanced Computer Networking Solutions, Suite 777, 427 7th St., Fairview, N.J. 07022.

Uniting

CONTINUED FROM PAGE 67

Software AG of North America, Inc. data base management system. "Our charter is to make it as easy as possible for people who need it to get it, to bridge those two worlds."

Bridging the PCs and VAXs to the mainframe has led to lower level staff workers freely communicating with each other via electronic mail across departments. In the past, a laborious process was followed, with memos climbing the chain of command in one department and going down the chain in another.

"We're changing the culture of the site," Johnson says enthusiastically.

It all began in 1982 when Johnson installed the first Ethernet LAN in the laboratory and put DEC's All-In-1 office automation package on it. He had previously tied PCs to DEC PDP-11 minicomputers because laboratory workers who had their experiments on-line also wanted their office PCs on-line to monitor the experiment, Johnson recalls.

"It was strictly grass-roots type of work. Upper management did not know about or encourage this project," he says.

Learning the needs

At the time this unsanctioned pilot was underway, a data processing visionary, Bruce Ferguson, the first department chief who has since left the plant, advocated a study of the information processing needs of the site. The study would eventually conclude that a computer network would make 5,000 information workers 5% to 10% more effective. "The estimated payback was tremendous," Johnson says; the Computer Projects Department was founded with a $100 million budget for a nine-year period.

Thompson, who became department head after Ferguson left, had trouble finding the skilled people he needed to rapidly expand the unit. He had difficulty attracting people to backcountry South Carolina and started out using contract workers who offered their skills for a fixed period rather than agreeing to hire on. Eventually, that practice evolved into hiring contract people who agreed to become Du Pont Co. employees (Du Pont operates the plant), and the challenge of the job has been sufficient to keep many of them in the department, he says.

Meanwhile, Johnson, who had arrived at the plant in 1982 to write meteorological Fortran programs, was on the leading edge of Ethernet. As users asked to be included on the network, he found that wiring the sprawling, low-slung buildings around the site strained Ethernet to its maximum 2,800-meter distance. Just as demand outstripped that limitation, he found repeaters coming onto the market, enabling him to extend Ethernet. And as more and more Ethernet networks were established, bridges came onto the market, allowing him to link them together into one network.

On a local scale, Johnson had already worked out the DEC VT100 and VT200 terminal emulation that would allow a PC to connect to a VAX and the 3270 terminal emulation that would enable VAXs to communicate with IBM mainframes.

Savannah River Plant's Johnson

The Ethernet networks were joined across the site by making use of a broadband cable television network that had previously been installed for TV surveillance. The cable network speeded the network-building process and enabled an Ethernet user at one end of the site to easily communicate with another 18 miles away, Johnson says.

Thompson's six-person development staff has customized All-In-1, allowing high-priority messages "to bubble up to the top" and saving busy users from catching up on every message when they come back from an absence, he says.

Thompson says the staff wants to expand the users' capability to perform document transfers among the 1,500 Macintoshes, 2,000 IBM PCs and 100 VAXs on the site. He also continues to add about 100 users a month as the network reaches out farther and farther from the plant's central offices.

Thompson and Johnson say they are laying the basic information pipelines that will automate the site far into the future and have little doubt it will be a long-lived accomplishment. At the same time, they admit to occasionally being baffled by all they have wrought.

One Ethernet network persistently went down between 4:30 p.m. and 5 p.m., and neither official could determine the cause. Then, one day, Johnson tracked the offending node to a trailer outside a building, where a maid daily unplugged the bridge connector for a half-hour as she plugged in her vacuum cleaner to work in the temporary office.

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Clinton Wilder

Services skirmishes

As in a news dispatch from a Third World border conflict, skirmishes have broken out on three different fronts in the increasingly competitive — and fascinating — professional computer services business.

As noted in this space three weeks ago, the Battle of the Big Eight continues to rage, with fired and former Arthur Young consultants jumping ship to their newly formed competitor, Technology Solutions, and Arthur Andersen decommissioning the head of its consulting practice for suspicion of planning a similar gambit.

Ten days ago, Mountainside, N.J. witnessed not so much a skirmish as the appearance of a potentially powerful new army in professional services: Nynex.

The regional Bell holding company's $273 million acquisition of AGS Computers' software and services businesses makes sense for both parties for a host of reasons.

AGS is no stranger to the telecommunications field, as it grew up by designing software and systems for AT&T's huge operations across the Garden State. For Nynex, the deal bolsters its move into professional

Continued on page 74

Qume seeking happy ending

Founder Lee regains control of offspring, hopes to challenge HP, Apple

BY ALAN ALPER
CW STAFF

SANTA CLARA, Calif. — Silicon Valley abounds with soap opera-like stories of entrepreneurs who could or couldn't, but never before has an episode aired that ends with the founding father reacquiring the company he sold a decade earlier for one-eighth the price. This installment is called "Qume Redux."

Our story begins with David S. Lee, patriarch of the daisywheel printer business. He cofounded Diablo Corp., the company that pioneered daisywheel printing, in 1969. That company was sold to Xerox Corp. in 1972.

Lee then established Qume Corp. in 1973. He built Qume into the leading daisywheel printer maker and sold the firm to ITT Corp. in 1978 for $164 million. Nine years later, ITT sold Qume to Alcatel N.V. in the Netherlands as part of a multi-billion dollar sale of its computer and telecommunications assets.

Qume's Lee

But earlier this month, Lee, now chairman of storage controller maker Data Technology, Inc., reacquired Qume from Alcatel for $20 million (CW, June 13).

The plot line for follow-on installments to "Qume Redux" gets a little hazy, industry watchers said, but one thing is certain: Qume is a ghost of its former self. Its annual revenue is at the same $70 million it reached in 1978. Before Lee sold Qume, its revenue was doubling every year. But in recent years, revenue has shrunk 50% annually, and profitability has receded far into history. Perhaps, industry observers suggested, that explains Qume's fire-sale price tag.

Lee said he is unswayed by skeptics who think he has reacquired more trouble than Qume is worth. The 51-year-old executive said he feels Qume's name and well-entrenched worldwide distribution channels make the company a bargain at almost any price.

Moreover, he said he intends to change Data Technology's name to Qume, a name that printer and controller customers can better identify.

"I always tell people, I'm very lucky," the enthusiastic Lee said of the acquisition. "Now I tell them I'm lucky again to acquire Qume."

Lee's administrative skill and business acumen will play a larger role than luck in making this acquisition work, observers said. He has already trimmed fat by reducing Qume's 800-member work force by 100 and is reas-

Continued on page 77

Data View

On the right track

The U.S. slashed its worldwide electronics trade deficit by 32% in the first quarter compared with year-earlier results but made no headway against Japan

INFORMATION PROVIDED BY THE AMERICAN ELECTRONICS ASSOCIATION
CW CHART

DOD freeze may chill computer firms' income

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A temporary spending freeze by the U.S. Department of Defense (DOD) has defense computer vendors worried that it will affect their bottom lines if the freeze drags out to the end of the fiscal year.

Computer vendors are "holding their breath" as they wait to hear whether the freeze will last beyond June 30, while DOD computer managers are scurrying to see if they can get an exemption by justifying their purchases as mission-critical, said Eben Townes, a procurement analyst at International Data Corp.'s Washington division.

The freeze was imposed May 20 by Deputy Secretary of Defense William H. Taft IV because Pentagon spending was outpacing its budget under the Gramm-Rudman-Hollings budget law. Taft said DOD spending was $2.5 billion ahead of plan.

John A. Young, chairman and president of Hewlett-Packard Co., said at a New York security analysts meeting last week that if the spending freeze continues

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Pansophic lays off 47; crash trims profits

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Pansophic Systems, Inc. announced last week that it has cut 47 jobs from its 1,400-member work force to trim administrative costs.

"The company has grown very rapidly," said Pansophic Chief Executive Officer David J. Eakra, "and sometimes you have to cut back a little to make sure your priorities are in line." Of the 47 jobs eliminated, 19 came through resignation or attrition and 28 were layoffs announced to the affected employees on Wednesday.

Whenever Pansophic resumes hiring, Eakra said, those 47 positions would not be replaced. The layoffs will not affect field service or product development, he added.

The layoffs do not include the June 6 resignation of Pansophic Treasurer Michael Buppert, 33, who had been with the company for eight years. Buppert resigned soon after an audit revealed he had not included a $6.3 million loss from stock market investments in the company's second-quarter report.

Pansophic had a $50 million portfolio of stock and securities that rapidly lost value during the October 1987 stock market crash. As a direct result, the company's fiscal 1988 net profits dipped below year-earlier levels by 6% to $15.7 million.

"It was supposed to be a fully hedged strategy that would buy us a better spread than Treasury [bonds]," Eakra said of the stock market investment plan, which dated back to 1983. "What happened was that mismanagement of the portfolio left us naked in the face of the Oct. 19 crash. But the loss itself is not as severe as the fact that the loss was not stated in our financial report."

A June audit brought the loss to light, but Eakra said that he could not escape some measure of blame for the error.

"The things we had depended on to control situations within the company broke down," he said. He added that Pansophic has already moved to shift its cash investments into lower-risk securities.

The stock loss caused earnings per share for the year ended April 30 to be cut from $1.09 to 84 cents per share, Eakra said. In contrast, earnings per share for Pansophic's last fiscal year were 95 cents.

Pansophic's revenue for the year was $165.3 million, an increase of 44% from last year's $114.6 million. Operating income before the stock market loss was $24.4 million, a healthy increase of 21%.

Pansophic, founded in 1969, has just finished a binge of buying up small software firms. Next year, Eakra said, Pansophic will begin to introduce software that will integrate these separate products into a seamless end-user environment. The company hopes to offer a single Telon report generator for multiple computers, including the IBM mainframe, the System/38, and the Digital Equipment Corp. VAX by 1990.

"Our goal is platform independence for our customers," Eakra said. He said he expects Pansophic's System/38 software to be able to run without change on IBM's Silverlake computer, which is set to debut tomorrow.

Eventually, Eakra said, Pansophic and other software vendors may have to tune their programs to optimize performance on Silverlake.

TV chips seen crucial to U.S.

BY JAMES A. MARTIN
CW STAFF

Television, and not trade balance talks, could provide the setting for the next major battle between U.S. and Japanese semiconductor makers.

In order to gain a foothold in the world consumer electronics market — and thus in the world semiconductor market in general — it is imperative that U.S. companies develop chips for the expected boom in High Definition Television (HDTV), analysts and trade groups said at a recent forum sponsored by the American Electronics Association (AEA).

An HDTV task force was formed at the meeting, consisting of representatives from Hewlett-Packard Co., IBM, Apple Computer, Inc. and AT&T Information Systems as well as chip makers Motorola, Inc. and National Semiconductor Corp.

"Nonparticipation in this market by the U.S. electronics industry will mean loss of our leading-edge research and, in turn, our ability to compete in the emerging global marketplace," warned Pat Hill Hubbard, AEA vice-president.

HDTV is a new generation of television, with motion picture-quality images and compact-disk-quality sound, that is already available in Japan. Observers say the chip market for HDTV could be several billion dollars a year by the mid-1990s, and that the U.S. semiconductor industry must start working now to ensure that it obtains a strong share of the HDTV market and, thus, regains its worldwide competitive edge.

The participation by computer makers such as HP and IBM in the consumer electronics marketplace is minimal at best, analysts say. But interest is growing in regard to the potentially lucrative HDTV market.

"We follow many technologies that are not directly related to our businesses," explained Barry Bronson, manager of technology communications at HP's Palo Alto, Calif., laboratories. "There is some general interest in seeing where the technology is going and what opportunities may be available to us."

HDTV technology could bring breakthroughs in engineering and graphics workstation displays, Bronson added. "We are always trying to take advantage of the best technologies available, and HDTV represents a leading-edge display that could help to drive workstation display technology."

Bronson would not comment on HP's level of interest in entering the consumer electronics market.

HDTV is an opportunity not only to strengthen the American semiconductor industry but to increase the export levels to Japan, according to Drew Peck, a computer industry analyst for Donaldson, Lufkin & Jenrette, Inc. in New York.

Wilder

CONTINUED FROM PAGE 73

services, which began last year with the acquisition of Business Intelligence Services in the UK.

But the third current battlefront may be the most explosive of all. Electronic Data Systems founder H. Ross Perot, no stranger to real Third World skirmishes himself, fired a salvo directly at the heart of EDS's federal government business with the formation of Perot Systems Corp. [CW, June 6].

EDS moved quickly to defend its flank last week, giving its Government Systems Group its own head, EDS Senior Vice-President Stuart Reeves. The group has shared its leader, Senior Vice-President Paul Chiapparone, with EDS's General Motors business — clearly a handful in and of itself — since November.

An EDS spokesman admitted that the formation of Perot Systems, and its hiring of some 20 former EDS government systems employees, spurred EDS's executive appointments in Government Systems. "I think it probably speeded the decision," he said.

Meanwhile, Nynex certainly represents the proverbial deep-pocketed parent. And professional services — consulting, systems integration, custom software development — may well turn out to be the hottest market for the big players of the 1990s.

Companies like AGS, Computer Task Group and a slew of smaller colleagues were once scorned as "body shops" for hired-gun application development. Now all of those firms could represent significant acquisition value to large companies scrambling to jump aboard the systems consulting bandwagon.

Nynex clearly wants to play in the big leagues in the next several years, when large corporate MIS organizations appear willing to pay for outside help in designing strategic, mission-critical systems for competitive advantage. With those big bucks at stake, some key consultants at both Arthur Young and Arthur Andersen are also getting antsy about getting a piece of that action for themselves.

And exactly one day after his 18-month noncompete pact with General Motors ended, Ross Perot let the services industry know that it wouldn't have a real battle on its hands unless he was in there somewhere.

Wilder is *Computerworld*'s senior editor, computer industry.

"BEST COMPUTER NEWSPAPER"

HP says Spectrum financial payoff delayed

BY ALAN ALPER
CW STAFF

NEW YORK — Recent enhancements to Hewlett-Packard Co.'a Spectrum family of reduced instruction set computing (RISC)-based systems are not expected to pay dividends until later in the year, when Version 1.1 of the MPE XL operating system is adopted by a large percentage of the company'a installed base.

That pronouncement, made by HP executives at a semiannual meeting with security analysts here last week, was the corporate explanation for soft second-quarter demand for the key product family. Anticipation of new Spectrum family members, which are said to offer dramatic price-performance advantages over comparable Digital Equipment Corp. and IBM machines [CW, April 11], may have caused resellers and end users to delay purchases, said Douglas Chance, HP's executive vice-president of business systems.

HP customers may have also delayed hardware purchases in anticipation of MPE XL Version 1.1, which started shipping to key accounts and software vendors earlier this month and is said to offer major bug fixes and drastic performance improvements over the previous release. Since most users will not be exposed to the new version until the firm's user conference in Orlando, Fla., in August, Chance does not expect orders for RISC-based systems in the HP 3000 series to pick up until the fourth quarter ending Oct. 31.

"We expect big orders then, excluding economic factors," he noted after the meeting.

HP's commercial marketing efforts for Spectrum focus on converting the company's installed base to its Precision Architecture and generating interest among software developers and systems integrators, noted John Young, HP'a chairman. "We have a number of big deals that we're in the middle of," he said. "The momentum is building."

HP, which has spent some $500 million on Spectrum over the last five years, is counting on the family to keep its customers in the fold and eventually dislodge business from DEC and IBM. Spectrum, though, has been plagued by hardware and software delays and customer reluctance to invest time and energy in converting applications from HP'a standard computing architecture to RISC.

Results lauded

Excluding Spectrum, Young and other HP executives provided analysts with a glowing assessment of the Palo Alto, Calif., firm'a first-half results. HP'a international business was stronger than domestic results during the period because of the decline in the value of the dollar. Overseas sales now comprise 50% of the company'a revenue, Young said.

European demand for Unix-based systems and microcomputers was strong during the period, Young noted. HP is now the third largest microcomputer vendor in Europe, ahead of Compaq Computer Corp., and the second largest in France, behind Apple Computer, Inc., he added.

Young remains optimistic regarding business prospects for the second half of the year. His upbeat assessment comes despite a continuing memory-chip shortage that forced the company to postpone for four to six months delivery of its latest Intel Corp. 80386-based machine, and a recent action by the U.S. Department of Defense to freeze all purchases until at least July 1.

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Note: The third annual Computer Press Awards competition was held April 12, 1988, in New York. Co-sponsors of the competition are Citizen America Corp. and Computer Press Association.

COMPUTERWORLD

An IDG Communications Publication

Freeze

CONTINUED FROM PAGE 73

to Sept. 30, "it could have a significant impact on our business."

In addition to reducing HP sales to DOD, Young said, an extended freeze could harm the aerospace and defense contractors that are significant HP customers. He said 8% of HP's revenues came from the federal government in fiscal 1987.

Fred Bedard, manager of hardware products at Data General Corp.'s Federal Systems Division, said DOD computer managers are frustrated by the uncertainty and the need to defer their purchases.

The spending freeze will hurt vendors if it extends to Sept. 30, Bedard pointed out, because agencies typically spend a large part of their budgets at the end of the year.

The Taft memo said the freeze covers, among other things, personal computers, software development, office automation and other forms of information technology. Payments under existing contracts are not affected.

L. Douglas Lee, a defense analyst at the Washington Analysis Corp., said the freeze is likely to be extended beyond June 30 because the DOD budget problem will not "magically disappear" and may get worse.

The DOD is under intense pressure to meet its budget target so it can avoid being hit with across-the-board budget cuts mandated by the Gramm-Rudman-Hollings spending law.

Mid-Atlantic correspondent Alan Alper contributed to this story.

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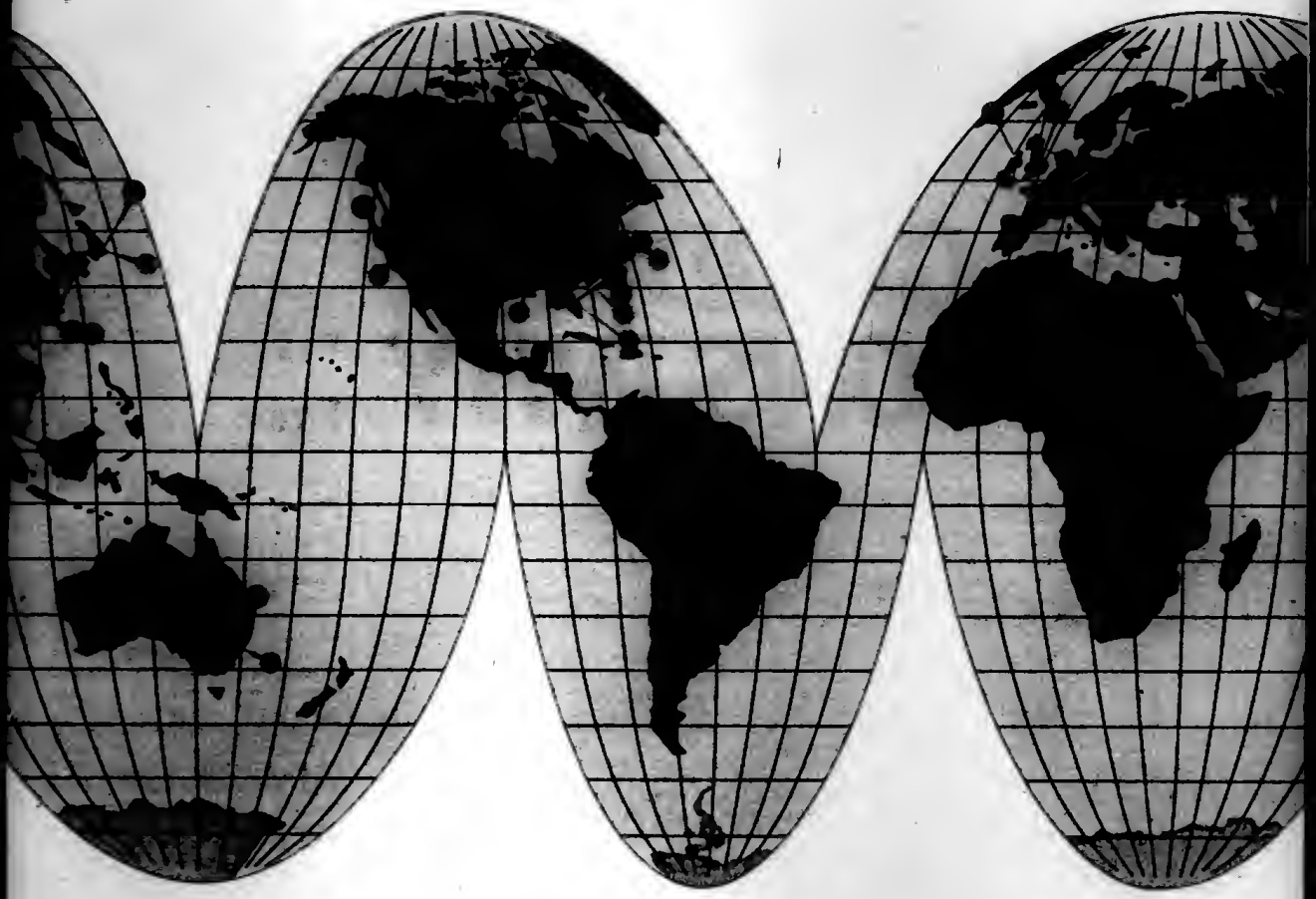

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INDUSTRY WEEK IN BRIEF

A new home and a new name are likely in the offing for Honeywell Bull next year. The mainframe and mid-range systems maker said last week it will move its corporate headquarters from Minneapolis to Billerica, Mass. If Honeywell, Inc. exercises its option at the end of the year to reduce its ownership to 19%, as expected, Honeywell Bull will likely remove "Honeywell" from the name, a spokeswoman said.

Gartner Group, Inc. is seeking a potential buyer. The Stamford, Conn.-based market research and consulting firm, founded in 1979, had revenues of about $40 million in its last fiscal year. British advertising and consulting firm Saatchi & Saatchi Co. has been rumored to be a potential suitor, although Gartner declined specific comment.

Shares of Phoenix Technologies Ltd. have gone on the market for an initial public offering price of $18 per share. More than three million shares of the Norwood, Mass., software compatibility products developer will be available in the offering.

Microcomputer mail-order house Logic Soft, Inc. in Farmingdale, N.Y., has filed for Chapter 11 bankruptcy protection. Among its listed creditors are Ashton-Tate Corp., Lotus Development Corp. and Zenith Data Systems.

Atari Corp. announced an out-of-court settlement of its lawsuit against memory chip maker Micron Technology, Inc. Terms were not disclosed. Atari had accused Micron of breaking contracts by raising memory chip prices.

Possibly fueling speculation about a potential acquisition of NCR Corp. [CW, June 13], Unisys Corp. announced that it intends to raise $300 million through a debt offering of 10-year notes.

Sun Microsystems, Inc. has been awarded more than $1 million in damages in its suit against memory board makers LCF International, Inc. and Custom Memory Systems, Inc. on charges of misappropriation of trade secrets. Mountain View, Calif.-based Sun claimed a confidential [illegible] of designing and manufacturing a Sun-3-compatible memory board.

The entire financial backbone of the [illegible] Corp. [illegible] Inc. [illegible] Mountain View, Calif.-based [illegible] recently reported a quarterly net loss of $9.3 million, or [illegible] cents a share, to the tune of $6 million to the banks to all its creditors.

Qume

CONTINUED FROM PAGE 73

sessing Qume's continuation as a supplier of various types of printers and terminals.

Lee said Qume will emphasize laser printers and de-emphasize daisywheels, the product on which it built its reputation. Analysts say such a strategy could pay off — other than captive supplier Apple Computer, Inc. and market leader Hewlett-Packard Co., no other firm has emerged as a formidable competitor.

A niche to be filled

"No one else has done anything significant except those two companies," said Bill Frank, an analyst at Infocorp in Cupertino, Calif. "There's an opening for another player, but to succeed, you have to do something unique."

One advantage Qume has is the fact that it manufactures its own printer controllers. Packaging Data Technology's controllers and low-cost Casio Ltd. print engines under the Qume name will give his company not only a price advantage but also the name recognition the company needs to compete, Lee said.

Lee is game for the challenge. He has already revitalized Data Technology, which was the No. 5 storage controller supplier when he took over 2½ years ago and is now No. 2, Lee claimed. The 8-year-old company did $100 million in business last year, twice what it chalked up in 1986.

Lee is also reassessing Qume's participation in the terminals business. The one-time No. 2 ASCII terminals vendor has sunk to the second tier, Lee said, and a retrenchment may be near.

"People know us as a printer company, and with a company like Wyse dominating the [terminals] business, it's hard to do much," he said.

An energetic, bubbling executive, Lee has always attracted a good management team wherever he worked. Observers contended that Lee will have to lure a new cast of managers if he is to succeed in resuscitating Qume.

"It's the leader in him, the man with a vision, that will make all this work," said Bhanu Bhattasali, an analyst at Dataquest, Inc. in San Jose, Calif.

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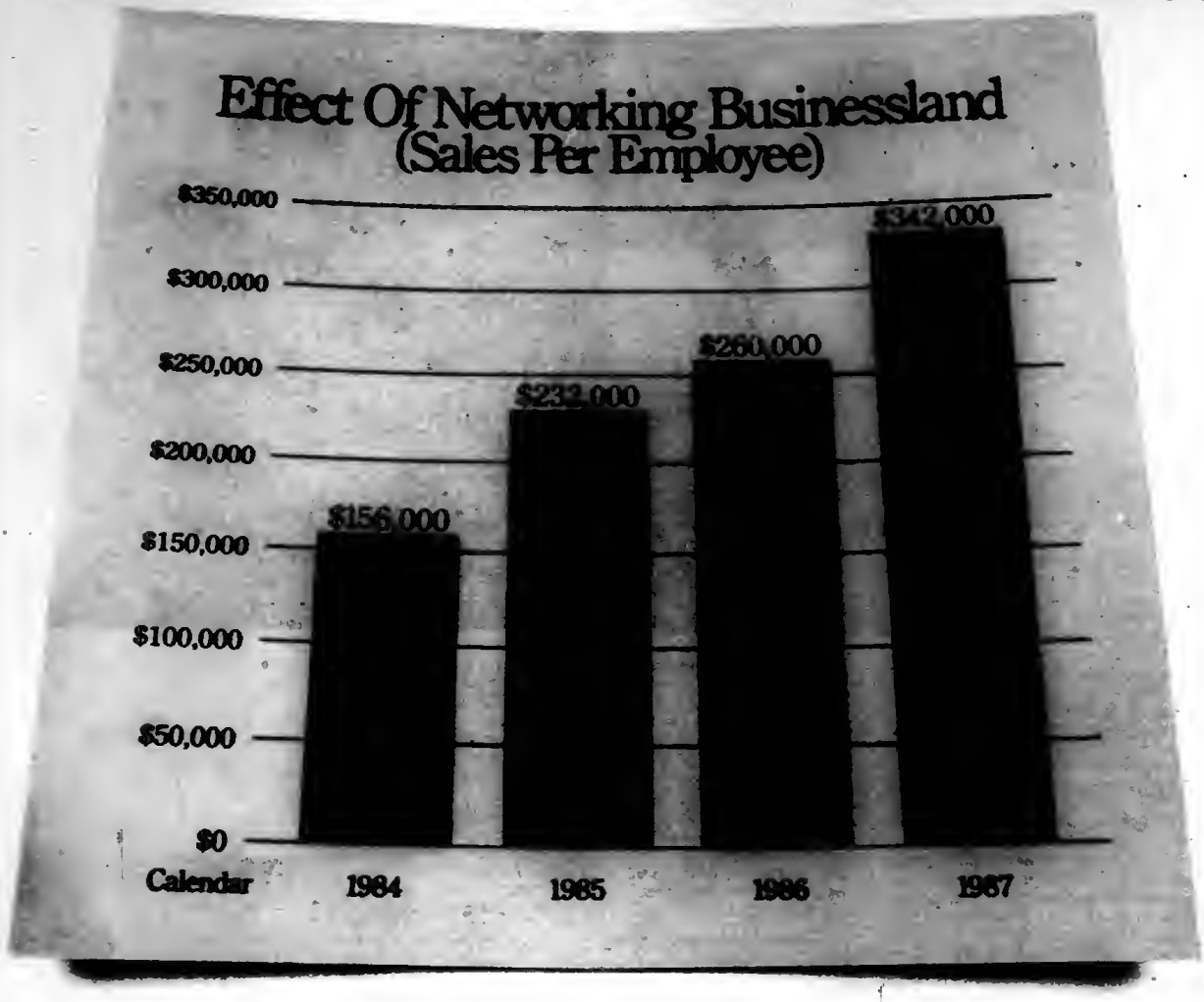

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COMPUTER CAREERS

Contract work: Risk vs. reward

Independents' earnings can be impressive but irregular

BY DAVID A. LUDLUM
CW STAFF

The party is over for those with a casual urge to be an independent computer programmer or data processing consultant. Tax law changes that took effect last year have eliminated opportunities for technical professionals to take on their own contract jobs without assuming the risk or overhead of running a business.

But for those willing to face that risk, to keep books and to sell clients on their services, it is still possible to work as an independent programmer or consultant. For others, the option of working for a technical services firm offers some of the attractions — and some of the drawbacks — of independence.

Section 1706 of the Tax Reform Act of 1986 drastically restricted opportunities for an individual to sell technical services as a contractor instead of facing the commitment and withholding taxes of an employee.

Section 1706 denies technical professionals the "safe harbor" that currently shields most other contractors from the common law standards that the IRS uses to classify taxpayers as employees or contractors. That means that in fields such as computer programming and DP consulting, an individual or company reporting income as a contractor is required to operate as a truly independent business — serving various clients, assuming risk and controlling the work.

Many former contractors who failed to meet Section 1706's new standards have become employees of technical services firms.

Skills and bodies

Companies generally use independent contractors or technical service firms on software development projects to secure skills that the permanent staff lacks or when they must build up the staff for a limited time. A contractor's assignment typically lasts three to six months, although they may range from less than a month to more than a year.

Market research firm International Data Corp. (IDC) in Framingham, Mass. expects the demand for contract systems development services to increase about 20% a year in the next five years. Much of the demand will stem from a growing willingness of companies to contract out complex chores such as system design and project management in conjunction with systems integration projects, according to Karen Kugel, IDC's program manager for computer services.

The two big attractions of working in contract jobs are the prospect of making more money than a comparable employee might earn and the ability to broaden one's horizons by moving among workplaces.

An independent contractor has the potential to make more than twice as much as a similarly knowledgeable salaried worker employed by his client, depending on the demand for his specific skills, according to Bill Ek, an independent contractor based in Los Angeles.

But the fatter paychecks reflect the reality that income might not be steady, both for independents and employees of technical services firms.

"It is a risk-oriented position in that nothing is guaranteed," said Daniel Sierra, director of contracts at Kenda Systems, Inc. in Salem, N.H., which does DP contract work with employees and also places independents in contract projects. "You could be out of work one or two months of the year. If you're not a good financial planner, you could be caught in a bind," he added.

Furthermore, independent contractors do not receive benefits such as disability and health insurance. Some technical services firms hire and provide workers with full benefits, while others treat workers as temporary employees and provide few extras beyond basic pay.

The savvy independent who does well financially still faces a host of other challenges. He must take care of administrative chores and market his services. "Anyone who is shy or reluctant to use personal contacts to get business is not going to make it," Ek said. "You can't be shy about getting someone on the horn and chatting about 'what I can do for your company.' "

Personality counts

Even salaried workers taking on contract jobs need some of this gift of gab to move from project to project, Sierra said. "Some people do not have the polish or a sterling ability to interview," he said.

Contract work can also mean being treated as an outsider. "You're a little bit isolated from the peers you work with," said Harry Tate, senior systems engineer working for technical services firm Computer Task Group, Inc. in Atlanta. "There are some things you don't have access to that a normal employee would — social activities, the softball league, company picnics," Tate said.

Sierra also noted that contract workers must get up to speed on a project quickly and that they lack a career path.

Ludlum is a Computerworld senior writer.

Contract expansion

*Worldwide revenue for contract systems design and programming by U.S. professional services vendors is projected to grow 20% annually**

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We have a few senior-level positions available that require eight or more years data processing experience. For two positions, prefer one plus year of marketing or sales experience. Additionally, candidates must possess the following qualifications:

- Bachelor's degree
- Experience in design, planning, management and implementation of information systems
- Extensive experience in the development of computer applications and the evaluation/selection of software packages
- Knowledge of various systems analysis techniques and familiarity with various programming languages, especially COBOL and Fourth Generation languages
- Track record of success in system design and project management
- Strong management/supervisory, planning and analytical skills
- Excellent oral and written communication skills

For confidential consideration, please send resume with salary requirements to: Corporate Headquarters/Employment, The Coca-Cola Company, P.O. Drawer 1734, Atlanta, GA 30301. An Equal Opportunity Employer.

MK MANAGING PROGRESS

Morrison Knudsen Corporation, a worldwide engineering/construction company, has the following position available in its Boise, Idaho headquarters office:

CICS-DL/I SYSTEMS PROGRAMMER

(Currently a 30000 environment with plans for ESA.)

Qualifications: Applicant must perform under general supervision and be competent in Systems Programming with ability to work on own. Applicant must possess:

- BS degree in Computer Science, Mathematics, or other related field.
- Minimum 4 years' experience as OS CICS Systems Programmer with a working knowledge of DL/I, VSAM, MVS/SP, TSO, and SMP.
- Strong Assembler Language skills and ability to analyze memory dumps and solve complex technical problems.

Morrison Knudsen offers a competitive salary and benefits package. If you are a leader in the industry looking for a challenging career, consider our reputation for excellence and send your resume and salary requirements to:

Morrison Knudsen Corporation
Employment Department
P.O. Box 8 - 10000
Boise, Idaho 83707

MORRISON-KNUDSEN COMPANY, INC.
Equal Opportunity Employer

ACP/TPF PROGRAMMER ANALYST

ACP/TPF PROGRAMMER ANALYST - PROJECT LEADER required. Analyze, code, test and implement program flows and enhancements for the ACP/TPF airport processing system. Projects will include design, development, and implementation of new executive program for domestic and international flights and will extend to room and bill selection for hotel and car rental reservations systems. Will provide functional software support, trace problems, dump dumps and provide overall system integrity. Will supervise a staff of 2 to 12 other analysts as group project leader.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 2 years experience in ACP/TPF Airline Control Programming. Education and experience will be found acceptable if applicant had a combination of work experience and professional development courses found to be equivalent to a B.S. Degree in Computer in addition to 2 years of ACP/TPF Airline Control Programming experience.

Salary will be $600.00 per week for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778-0001 J.O. #5126173. This advertisement was paid by an Equal Opportunity Employment Employer.

SOFTWARE OPPORTUNITIES

Data Processing Consulting

PROJECT-ORIENTED CONSULTING! WHAT IS IT?

It's NOT Contract Programming!

A Contract Programming Shop is basically a temporary help service, supplying programmers to fill short term labor needs. Contract programmers generally get involved only in the late stages of system development, doing what they already know, over and over. And unfortunately many contract programmers are effectively out of work between assignments. Contract programming is honest work, but it's NOT SEI's work.

It's NOT Just Management Consulting!

Management Consultants, on the other hand, often get involved only in the earliest stages of system planning and rarely take a direct hand in building the systems that they plan. Our opinion is that this has an unfortunate tendency toward Blue Sky. And, of course, management consultants often miss out on the fun of seeing the systems they plan come to life. Management consulting is a respectable profession, but it's NOT SEI's profession.

So, What IS Project-Oriented Consulting?

Project-Oriented Consulting stands squarely between the extremes represented by Contract Programming and Management Consulting, combining the best features of both worlds. At SEI, our clients look to us for RESULTS—not just plans or code. Yes, we do planning, and our business sense is second to none. Yes, we we do implementation, and our technical credentials are nationally recognized.

But more important, we do ALL of those things, and all the steps between. We use technology to solve business problems. We use our business experience to solve them effectively and sensibly.

Interested? If this sounds like the kind of work YOU should be doing, send a resume and salary history to:

SEI Information Technology
Attn: Phyllis Appel, Recruiting Coordinator
650 East Ohio Street
Chicago, Illinois 60611

SEI information technology
THE BUSINESS OF TECHNOLOGY

— An Equal Opportunity Employer M/F —

(Continued on Next Page)

CORNELL UNIVERSITY NATIONAL SUPERCOMPUTER FACILITY

Professional Opportunities in Advanced Scientific and Research Computing

The CORNELL THEORY CENTER, a major multidisciplinary research center devoted to the advancement of large-scale computing and a leader in parallel processing, is seeking computing professionals to fill positions in its SUPERCOMPUTER FACILITY (CNSF). Minimum requirements are BS degree, MS preferred, 3-5 years mainframe programming experience including IBM VM/CMS and FORTRAN, scientific computing. Positions include:

- Parallel Systems Software Engineer
- Scientific Applications Analyst
- Workstation Support Specialist
- Technical Consultants/User Support
- Scientific Software Analyst
- Graphics Consultants

Additional consideration will be given to candidates who possess the following:

- advanced degree in a scientific discipline
- familiarity with parallel processing environments
- UNIX, C experience
- knowledge of numerical techniques and computational science
- workstation/mainframe graphics experience

Please submit cover letters and resumes to: Judith Baker, Staffing Services, Dept. TC-CW, CORNELL UNIVERSITY, 100 Day Hall, Ithaca, NY 14853.

CORNELL THEORY CENTER

Applicants must meet employment eligibility requirements in accordance with the Immigration Reform and Control Act of 1986.

An Affirmative Action/Equal Opportunity Employer

$2 BILLION IN SALES. AND THAT'S JUST THE BEGINNING.

(Opportunities in Phoenix)

Built on the established strengths of Honeywell Information Systems, joined in a unique transnational partnership with the expertise of France's Compagnie des Machines Bull and NEC Corporation of Japan. An important, dynamic presence in the national and international marketplaces: Honeywell Bull.

Yes, we've established a record of success. But now we're pledged to creating even more effective systems solutions. Even stronger leadership. An even more exciting environment for motivated professionals like you.

Experience the exhilaration of a computer start-up that's off and running. Begin working with Honeywell Bull in Phoenix.

Principal Engineers

Four positions are currently available. Successful candidates for two will assume responsibility for technical support, quality resolutions and improvement recommendations regarding manufacturing systems, in addition to product development and marketing. Experience with the maintenance of large development production program libraries, as well as TSS, GCOS8, IDS/II, DMIV-TP/TP8, and COBOL 74 are required, as are excellent communication skills and strong documentation experience. Exposure to *UNIX*® and "C" is desirable.

As a Principal Engineer in one of the remaining positions, you will be responsible for analyzing, designing, programming and testing on a major software application project, including quality and design performance, and some technical and functional leadership. Background of 5 years' IDS/II or similar database as well as DMIV-TP is required. A minimum of 3 years' experience in software development and state-of-the-art system design is necessary. Some leadership experience is preferred.

Manager Applications Development

Direct, administer and review our major application system design and development organization. The systems involve highly complex functions applied to discreet manufacturing needs, designed in response to our customers' functional requirements. You will be accountable for contributing to the planning and implementation of future system design and development. To qualify, you will need experience in several of the following areas: shop floor control, factory data collection, time and attendance, and work-in-process, and a minimum of 5 years' experience managing large applications development projects. Additionally, we require 5+ years' experience in state-of-the-art design and development techniques including 3-5 years' with DPS6 and MOD 400 operating systems and applications, structured design, *UNIX*, "C", and fourth-generation reporting languages.

Senior Software Engineer

Responsibilities include analyzing, designing, programming and testing with some technical leadership, for a major software development project. This involves conformance to requirements and satisfaction of established schedules. Position requires 5 years' IDS/II or similar database, TDS (DPS7) or DMIV/TP as well as 2 years' experience in software development related to manufacturing.

Senior Software Engineer

Document, program and test applications on a large-scale MRP II system solution, with responsibility for producing quality software in compliance with design requirements. To qualify, you must have 3-5 years' experience with COBOL 74, IDS/II, DMIV-TP and/or TP8 in developing, maintaining, and converting applications systems. "TSM" and a background in structured design is preferred.

Project Leader Large-Scale

Contribute to the development and maintenance of large-scale manufacturing operations by providing detailed knowledge, support, and consultation to application developers as well as assisting in the certification of all applications on DPS7 and DPS8 software and hardware. You will also identify, develop, and acquire tools to facilitate application development and maintenance. To succeed, you will need a strong working knowledge of GCOS8, IDS/II, DMIV-TP or TP8, and 8-10 years in software and applications development, integrity control and testing. Strong knowledge of manufacturing operations is required.

Call Us 24 Hours a Day
1-800-[illegible]
for Recorded Information

Or, send your resume and salary history, in confidence, to: Mark Iorio, MS 39-517, Honeywell Bull, 200 Smith Street, Waltham, MA 02154. An Equal Opportunity Employer.

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Honeywell Bull

System Analysts

Boeing Computer Services, a division of Boeing, is working on some of today's most exciting leading-edge concepts in high technology and major information systems.

And we need the best and the brightest people to help us chart the future with imagination, innovation and new ideas.

Right now, we have outstanding opportunities for analysts with the experience to meet our requirements.

Here's What It Takes

These positions require 2+ years of capacity and/or performance tuning capabilities.

Analyst: MVS/XA, TSO and JES3 experience with RMF and SMF and working knowledge of tuning parameters and performance related OS commands required. IMS, DB2, CICS, CADAM, CATIA, GTF data, Omegamon, DASDOM, IMS commands with workload analysis and configuration planning experience is desired.

Analyst: With VMMAP and SMART required with workload analysis and capacity planning desired.

Here Are The Benefits

Because we are an industry leader, we can offer you the right salary, comprehensive benefits and challenging assignments within a unique climate for achievement.

And we can offer you something else, too — a lifestyle in the Puget Sound area of the Pacific Northwest — near Seattle — that's hard, if not impossible to beat.

Write Today

If your talent and our requirements are a match, please send your resume, with present and expected salary, to *Boeing Employment Office, P.O. Box 3707-PMX, Seattle, WA 98124.* No agencies, please.

We are an equal opportunity employer.

Boeing hires only U.S. citizens and lawfully authorized alien workers. You'll be required to provide proof of identity and authorization to work in the U.S.

BOEING

Unlock your potential.

If your present data processing position isn't meeting your expectations, you should turn to ROMAC®.

Your key to success can be a simple phone call to us. Our record of results is due to our unique and uncompromising personal and professional approach.

Meet with Success.

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Bala Cynwyd, PA 215-667-7351	Detroit, MI 313-567-2600	Paramus, NJ 201-599-0522	San Francisco, CA 415-788-2815
Boston, MA 617-439-4300	Ft. Lauderdale, FL 305-928-0811	Philadelphia, PA 215-568-6810	Seattle, WA 206-646-6640
Buffalo, NY 716-853-6203	Hartford, CT 203-525-8037	Portland, ME 207-773-4740	Stamford, CT 203-358-8155
Charlotte, NC 704-333-3166	Houston, TX 713-227-7700	Portsmouth, NH 603-431-2706	Tampa, FL 813-229-5575
Chicago, IL 312-263-0902	Jacksonville, FL 904-358-6868	Providence, RI 401-421-2250	Washington, DC 202-775-9055
Cleveland, OH 216-771-6822	Manchester, NH 603-647-0300	Raleigh, NC 919-878-4454	Wayne, PA 215-687-6107
Columbus, OH 614-221-7077	Memphis, TN 901-685-8300	Richmond, VA 804-644-0196	Wellesley Hills, MA 617-239-0900
Costa Mesa, CA 714-850-0788	Milford, CT 203-877-7545	Rochester, NY 716-232-4610	Wilmington, DE 302-658-6161
			Winston-Salem, NC 919-725-1933

ROMAC

All Romac offices are independently owned and operated.

SENIOR ACP/TPF APPLICATIONS ENGINEER

Senior ACP/TPF Applications Engineer required. Will manage a project team in the development of mainframe systems and upgrade of existing computer systems to handle airline, hotel, car rental and reservations products. Responsible for project team output of all analysis design, coding, testing, documentation, implementation and supporting of various application development efforts. Develop project team members by identifying training needs and conducting performance management system reviews. Interface with marketing to a professional and tactful manner to determine customer needs and provide timely and efficient products to meet these needs. Supervise group of 10-15 analysts.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 4 years experience as an ACP/TPF Systems Analysis. Education and experience will be found acceptable if applicant has a combination of education and experience found to be equivalent to a B.S. Degree including at least 4 years experience as an ACP/TPF Systems Analyst.

Salary will be $48,000.00/year for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778-0001. Job number 6180174. Ad Paid by an Equal Employment Opportunity Employer.

RESEARCH STAFF MEMBER (Westchester Co., NY): Conduct search on design & output of new generation of computer algebra systems which adapt & dvlp modern programming languages technology to solve long standing problems in computer algebra. Design & dvlp compiler for an abstract data type language, to interface w/ and aid application of such a system to mathematicians, physicists & eng'rs. In design, implementation, & testing of algorithms for parallel decomposition computer algebraic tasks & in design & implementation of interpreter & user-interfaces for computer algebra. PhD in Comp Sci + 1 yr in job or 1 yr as research/teaching asst in computer algebra tasks req'd. 1 yr exp must incl design of algorithms for computer algebra, computer algebra system design, computer design-abstract data types & language design. Must have published on relevant topics. Research/teaching exp may be substituted for grad or post-doc level. 40 hrs/wk; 8:30 - 5:12pm; $69,000/yr; EOE; travel rm of latter only 15 DLR, enclosing qualifications w/ RVB #2000, Rm 801, 1 Main St, Hdqrs, NY 11201.

Data Processing Consulting

GREAT CONSULTANTS ARE MADE NOT BORN!

HERE'S HOW WE DO IT!

SEI builds experts. We build them by:

- Having them work alongside senior SEI consultants, nationally recognized authorities in such areas as Data Base Management, Distributed Processing, Industrial Automation and Robotics, Networking, Communications, and Hardware and System Software Development.
- Assigning them to demanding, challenging projects that cover the range of planning and development activities for system and application software on mainframes, minis, and micros. SEI builds the basic product delivery systems through which our clients conduct their businesses.
- Providing opportunities to represent SEI on technical and standards committees that set directions for the industry.

Talent is Required, Of Course!

There are some important abilities you need to start with. SEI's consultants are characterized by general good sense, good technical backgrounds, and an attitude that the next challenge could be even better than the current one.

We look for people who work hard, are eager to learn, are serious about their careers, and who enjoy the variety and challenge of Project-Oriented Consulting. (For more about Project-Oriented Consulting, see our message on the previous page.)

Interested? If YOU'VE got what it takes to become a STAR, send a resume and salary history to:

SEI Information Technology
Attn: Phyllis Appel, Recruiting Coordinator
454 East Ohio Street
Chicago, Illinois 60611

SEI information technology
THE BUSINESS OF TECHNOLOGY

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(Continued on Next Page)

PERMANENT AND/OR CONSULTING POSITIONS

DEC
- Programmers–VAX, VMS, BASIC, banking experience a +

IBM
- Prog'rs-FOCUS experience necessary
- Commun Spec.-CICS, TCAM

HONEYWELL
- Prog'rs-GMAP, GCOS, 3 or 8

Please call 212-984-9000
Or Submit Resume To:

HANK WALSH ASSOCIATES
475 Fifth Ave, NY, NY 10017

1000 DP Opportunities

Corporate Personnel Consultants

Florida Informanagement Services, Inc., a leading financial data processing center, is currently accepting applications for the following positions:

PROGRAMMER/ANALYST
Loan Applications

Loan experience, preferably in secondary mortgage market, and 4 plus years COBOL experience in a large mainframe environment, especially UNISYS is preferred, along with the ability to set high quality standards in your work.

SYSTEMS ANALYST
Loans

4 plus years experience in analysis design or programming in the financial industry required. Project management skills and specialized knowledge of mortgage banking and investor accounting a plus. Knowledge of loan concepts is required.

Four year degree in computer science or related field is preferred.

We offer competitive salaries including 401(K) profit sharing; excellent benefits package with vision, dental, and fully paid dependent medical. Send resume and salary history in confidence to:

FLORIDA INFORMANAGEMENT SERVICES, INC.
Attn: Human Resources
P.O. Box 1547
Orlando, FL 32802

FLORIDA INFORMANAGEMENT SERVICES, INC

Equal Opportunity Employer M/F/H/V

SCIENTIFIC PROGRAMMER ANALYST

This position requires a BS in Computer Science or in a scientific discipline with 3 to 5 years experience as a programmer analyst using Fortran in a laboratory environment. Experience with HP1000 (RTE4, CALL) IBM PC, IBM 3081 and Focus highly desired.

We are a Johnson & Johnson Company and a leading manufacturer of over-the-counter pharmaceuticals. Our modern facility is conveniently located in a pleasant Philadelphia suburb and we provide a competitive salary and benefit package as well as potential for continued professional growth. For prompt consideration, forward your resume with salary history and requirements, in confidence, to Joe Dubin, Sr. Personnel Administrator.

McNEIL CONSUMER PRODUCTS COMPANY
Camp Hill Road
Fort Washington, PA 19034

Equal Oppty. Employer, M/F/H/V

UNISYS

DMS 1100, DMS II, UNC, MCP, COBOL, TELCON, and EXEC professionals on Burroughs or Sperry hardware are needed immediately for special opportunities from coast to coast. To confidentially explore exciting new career opportunities, mail a resume or call Gary Pagnotta, CPC.

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(800) 268-1871
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DP OPPORTUNITIES

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One Commercial Plaza

VICE PRESIDENT-OPERATIONS
Manage a staff of 75-100 operations personnel in state-of-the-art cov. Req'd is 5 + yrs strong mgmt skills, 3 + yrs network mgmt plus IBM bkgd and exp in on-line. Exceptional sr level position with central Conn client. Full relac + bonus will make 1st yr earnings 90-100K. Base salary $65-80,000.

DATA BASE ADMINISTRATOR
Manage the start-up of a new DB area. Evel, select and manage the install of new DB software. This is a sr level pos'n. Req'd is exp with 4GL DB (ORACLE, DB2) or strong bkgd with IMS/IDMS/ADR. Excell growth potential. Paid relac. Salary $40-$53,000

MANUFACTURING SYST. CONSULTANT
Join growing R.E. sales center as a sr level consultant. Install new software products in DEC/VAX environ. Pkages are ASK/MANMAN, APICS exp with MRP, shop floor control, quality control, order digest systems — financial bkgd. Suburban loc. Salary $42-$50,000. +

BUFFALO, NY 14202 (716) 842-0001
420 Main Street, 1112 Liberty Building

RPG III ANALYST PROGRAMMER
Fast paced upstate New York manufacturing firm seeks senior analyst programmer for growing S/38 department. Prefer minimum 2 years experience plus knowledge of manufacturing. Outstanding career growth in stable company. To $35,000.

R.P. MANAGER
Large process manufacturer in a scenic, small Western New York community needs a R.P. Mgr for their DOS/VSE COBOL/RPG dept. Manage department of 10. Requires BA/BS degree + shirt-sleeve technical orientation. Very stable company offers career opportunity in excellent living area. To $50,000.

CHARLOTTE, NC 28244 (704) 338-0550
1305 Charlotte Plaza

ADABAS/NATURAL
Fortune 500 co. seeks exp'd prog/anal with 2 + yrs ADABAS exp in an IBM env. State-of-the-art shop. Will work on dev of on-line (CICS) DB systems fin'l, sales, marketing or distribution appl'ns exp a plus. Many benefits. Salary to $37,000.

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6200 Bardstown Lane

SYSTEMS PROGRAMMER
Excellent Kentucky company seeking professional with 3 + yrs system programming experience in an IBM Main-frame, MVS environment. Salary to $30,000.

PROGRAMMER ANALYST
Local company looking for individual with 3 + years on-line IBM Main-frame programming and Database background a plus. Salary to $35,000.

ROBERT HALF
DATA PROCESSING PERSONNEL SPECIALISTS

Contact Manager at office listed above. Client Companies Assume All Fees.

There is no Substitute for Talent.

Talent is more than natural ability. It is a combination of inherent aptitude, motivation, discipline and follow through. It is an attitude.

Talented employees deliver results, give you confidence and peace of mind. CompuSearch Account Executives can deliver these accomplished people to serve you, because finding talent is our talent.

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POSITIONS AVAILABLE

U.S. Department of Energy - The ADP Services Staff of the Energy Information Administration (EIA) has two computer specialists positions available.

Computer Specialist (Systems Programmer), Announcement 88-EI-108. A seasoned systems programmer is needed to direct the activities of a team that is responsible for the operating system software that supports EIA's mainframe. Candidates must have recent experience installing and maintaining operating system software on a large IBM mainframe. Both MVS and VM software experience are desired and experience in the area of electronic publishing is a definite plus. Strong written and oral communications skills are also required as well as the ability to work with users of the computer facility. Salary ranges from $38,501 to $61,384.

Computer Specialist (Data Communications Systems Programmer), Announcement 88-EI-088. An experienced data communications systems programmer is needed to direct the activities of a team that is responsible for the software and hardware that supports EIA's Data Communications Network. Candidates must have recent experience installing and maintaining communications system software, and a good understanding of communications hardware, for large IBM mainframes and IBM 3725 Communications Controllers.

VTAM, BTAM, NCP, and EP software experience is desired, as well as X.25 and LAN experience. Strong written and oral communications skills are also required as well as the ability to work with users of the computer facility. Salary ranges from $38,301 to $61,384.

To apply, prepare and submit an Application for Federal Employment-SF-171 to: Joyce Gilbert, Announcement 88-EI-108 or 88-EI-088, U.S. Department of Energy, Office of Personnel, Room 4F-083, 1000 Independence Avenue, SW, Washington, DC 20585. U.S. Citizenship is required. For additional information call (202) 586-8062. Applications must be received by close of business, July 15, 1988.

Computer Software Engineer: 40 hrs per/wk. 8 am to 4 pm. $[illegible]/yr. The job involves in design & development of real-time digital radiographic system. The duties include: Protocol design for image subtraction, integration, display & storage; software structure [illegible], code development of interfaces with acquisition system, display processor & operating systems. MS degree required in Comp. Sci. The job requires graduate courses in computer graphics, digital radiography, computer circuit design & simulation language. The applicant must have design & implemented software projects on RSX (Real-Time Multi Tasking Executive) VAX (Virtual Address Extension)/VMS (Virtual Memory System) operating systems, by using [illegible] assembler, C, & TLM (program language for micro processor) languages. At least 1 yr programming exp. in real-time image processing & interrupt handler is required. Applicants send resume to: Illinois Dept. of Employment Security, 401 S. State St. 3S, Chicago, IL 60605, Attn: Robert S. Felton. Ref# VIL7948-F. An Employer Paid Ad.

Consulting Opportunities

Programmers, Designers, Analysts, DBA's, Technical Writers, System Analysts, Administrators, Engineers sought for per diem and permanent positions:

- DB2, SQL
- CICS
- [illegible]
- COBOL
- PL/I
- FOCUS
- NOMAD
- ADABAS/NATURAL
- UNIX (Appl. & Int'ls)
- [illegible]
- C
- SYBASE
- [illegible]
- VAX/VMS
- [illegible]
- [illegible]
- PC's
- [illegible] ENGR'S
- SOFTWARE ENGR'S
- HARDWARE ENGR'S
- MECHANICAL ENGR'S

Other positions also available. Please call or send resumes to...

Structured Logic Systems, Inc.

[illegible] Road, Suite [illegible], Atlanta, GA [illegible]

Two Penn Plaza, Suite 1540, New York, NY 10121

1-800-[illegible]

Must Have Minimum Two Years Experience.

[illegible]

SYSTEMS SOFTWARE DEVELOPER

Worldwide vendor of database performance monitor software has opening for experienced IBM assembler language programmer at headquarters in the Seattle, Washington area. Excellent compensation and benefits. Dynamic, informal atmosphere.

Develop new releases of ADABAS and DB2 performance monitors. Design, documentation, coding, and testing as part of a small, self-directed, development team.

Requirements: Excellent skills in coding and maintaining IBM BAL. Familiarity with ADABAS and/or DB2 a strong plus. CICS or IMS/DC experience desirable. Project management experience helpful.

Send resume to: DataBase Utility Group, Inc., P.O. Box 4129, Federal Way, WA 98063

MAINE - NH

We have specialized in data processing professional placement in Maine & NH for a quarter of a century. If you qualify for positions in the $25,000-$50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.

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Portland, ME 04112
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WEST COAST ANALYSTS/ PROGRAMMERS

The west coast's fastest growing computer consulting firm, IG Systems, Inc. has openings for experienced analysts and programmers at several US locations. Full time employee and consulting positions available for sharp, energetic professionals looking for a challenge.

Full benefits, training and bonus program offered. Opportunities exist in Los Angeles, San Francisco, Austin, Dallas, Boston, Atlanta and other project locations.

Send resume to:

IG Systems Headquarters
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Los Angeles, CA 90010
(213) [illegible]

Engineers:

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At Allen-Bradley, our success depends on the quality craftsmanship that goes into our breakthrough industrial communications products.

Allen-Bradley offers a progressive environment featuring state-of-the-art equipment, career development opportunities and the respect and recognition committed professionals deserve. Right now, we have a variety of engineering positions available.

We are looking for hardware and software engineers with a BSEE or BSCS and 1 to 5 years' experience. Backgrounds in the 68000 family, Ethernet, 802.3, 802.4, MAP, Intel 8086/8088, LAN, IBM PC, MS-DOS, OS/2, VAX/VMS, "C" and assembler languages, data communications, realtime communication applications, a strong microprocessor base and communication networking are preferred.

Several senior and staff level engineer openings exist in the areas of:

Computer Interface Products
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We can offer competitive compensation and benefits including an excellent relocation program. Our work atmosphere allows you to organize your own time and set your own goals. For consideration, please send your resume to: Linda Sachs, Allen-Bradley Communication Division, Dept. CW620, 555 Briarwood Circle, Ann Arbor, MI 48108.

Equal Opportunity Employer M/F/H/V

ALLEN-BRADLEY
A ROCKWELL INTERNATIONAL COMPANY

VAX LEAD COVERAGE SYSTEMS ANALYST

VAX LEAD COVERAGE SYSTEMS ANALYST required. Responsible for development, installation, monitoring and analysis of SABRE System including communications software and protocols to provide connectivity to outside data processing systems and to interface with public and private networks. Monitors and tailors operating system parameters in VMS environment. Functions as a project leader and/or technical leader as necessary for group of 2-5 VAX analysts. Provides technical training and guidance to less senior systems analysts and programmers in the group. Provides technical expertise in the area of VMS/VAX communications software.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 2 years experience in VMS Operating Environment as Engineer or Systems Analyst. Experience must include prior use of one or more fourth generation programming languages.

Salary will be $37,000.00 per year for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778-0001 J.O. #5158176. This advertisement was paid by an Equal Opportunity Employment Employer.

RESEARCH TRIANGLE OPPORTUNITIES

SYSTEMS ENGINEER (Software Engineer)

Software Engineer for firm in NE Ohio to be responsible for development & integration of factory automation systems; design & develop 3-dimensional computer models of mechanical/moving parts; make architectural & mechanical images of machinery parts & robotics by applying standard engineering rules to computer; create initial design & of adaptions, changes & manipulations. Requires minimum M.S. in Computer Science or any field of engineering & 4 yrs experience in computer software analysis including 1 yr experience in UNIX, C, Ethernet & X.25 systems & processing languages. 3 in image processing, pattern recognition, artificial intelligence & graph theory; experience may have been gained while working toward degree. 40 hrs/wk, 8am-5pm. $[illegible]/yr. Qualified applicants only. SEND RESUME to R. Lechler, JO# [illegible], Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

CONSULTANTS

Unique position exists with a highly prestigious St. Louis-based firm for a 4+-year systems analyst seeking a dynamic career opportunity. Emphasis is on IBM mainframe, COBOL, CICS environment would be a definite plus. This position will provide tremendous promotional potential and an opportunity to utilize your strong communication skills. Outstanding opportunity! Salary to $40,000

[illegible]
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SOFTWARE DEVELOPER

SOFTWARE DEVELOPER: Full-time position to work for MIS development firm located in Central Ohio. Work Schedule: 8:00 A.M. to 5:00 P.M. Position involves design, development, and testing of conversion software to enable portability of BASIS on selected operating systems and hardware. Qualified individual must have an M.S. in CIS or electrical and computer engineering or electrical engineering. Must also have a minimum of six months of experience in position offered or related occupation (software developer). Must have successfully completed a conversion of a text information management system, including development of directory sections, in a main-frame environment. Must have written 7920 lines of CYBIL on NOS/VE. Must have taken (a) graduate-level course(s) requiring software development projects in conversion with an aggregate of at least three different operating systems. Must have written 1500 lines of FORTRAN. Must have proficiency in file manipulation by successfully completing a graduate-level course in computer system design requiring completion of a file manipulation project. Above requirements may have been gained concurrently and/or as part of experience. Salary $34,517 to $37,100 per year based on qualifications. Send Resume to R. Lechler, JO# 3046379, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

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Jr. to Sr. level programmers with 1+ yrs. exp. in IBM & other languages (PASCAL, "C," ASSEMBLER, PL-1 etc.) Contract assignments 12 mos. + $25-35/hr + benefits package. In confidence, contact Al Blackman, CPC.

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Responsibilities include: Analyzing the output that is received when each new Office Dependent Data (ODD) load is released and executed with the "CHKODD" tool that is to translate Hexadecimal form in ODD to decimals using Mathematics for prior to correction and population; Writing Immediate Modification Requests (IMRs) for the errors found with the relations in the ODD; Planning and configuring the tabs in which the ODD's are used for future generics (5E5 and 5E6) based on the feature requirements received. No experience necessary, but must have a Bachelor Degree in Computer Science. Course of study must include 24 semester hours in Mathematics. Resume with transcript to verify course study. Offered salary $31,000 per year, 40 hrs. per week, 8:00 a.m. to 5:00 p.m., M-F. Send resumes to Illinois Department of Employment Security, 401 S. State St., 3-South, Chicago, IL 60605. Attn: Robert S. Felton, Ref. V-IL [illegible]-F. An Employer Paid Ad.

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(213) [illegible]
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Senior ACP/PARS Programmer Analyst

Senior ACP/PARS Programmer Analyst to create symbolic statement of problem using flowcharts and models. Confers with project leader and team members to resolve technical questions. Designs, tests and maintains software programs using BAL. Works in Airline Control Program (ACP/TPF) Passenger Airline Reservations (PARS). Provide technical guidance to users and programming staff. Must have min. B.S. in Math or Science + one year exp. in ACP/PARS & BAL. Hrs: Mon - Fri 8:00 A.M. - 5:00 P.M. Salary: $2,048 - $4,138 mo. 80 per exp. Submit resume only to Job Service of Florida, 701 S.W. 27th Avenue, Miami, FL 33135. Ref. Job Order #FL [illegible].

COMPUTER SCIENTIST/RESEARCHER: Conduct research and development of special-purpose theorem proving systems for each of the following domains:

- Designing and building a state-of-the-art theorem prover for general equalities and linear sums of quantities taken from an arbitrary ring of integers or modular ring of integers, with emphasis on speed and proving power;

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- Designing and building a theorem prover incorporating a decision procedure for reasoning with Convex and Union-of Convex Time Intervals, and building an incremental truth maintenance system for sets of atomic interval formulas;

- Designing and building a theorem prover to accomplish automatic verification of correctness of automated transformations of specifications to code in a special-purpose software engineering domain; and

- Designing and building a theorem prover for an existing very-high-level software development language involving existing data types including sets, formal arithmetic, and modular arithmetic.

Incorporate all theorem provers above into an existing very-high-level software development prototype, placing special emphasis on modularization, systems integration, usability, and well-designed maintainable systems code. Supervise research conducted by Stanford University Ph.D. students.

Minimum requirements:
- Ph.D. in Computer Science in the area of Automated Theorem Proving;
- 2 years experience in computer science research, evidenced by a substantial research record in Automatic Theorem Proving, Decision Procedures, Domain-Dependent Inference, and Symbolic Computation or Computational Mathematics, including refereed publications in accepted major forums in the field of Automated Theorem Proving;
- Substantial research record (including refereed publications) in providing theoretical solutions to open problems in a sub-domain of Automatic Theorem Proving, and carrying these theories through to implementation in a working system;
- 3 years employment - or Ph.D. research-related experience in theoretical and practical aspects of major, mature computer theorem proving systems, machine reasoning with equalities, finite set theory, and in the domain of integers and modular rings and their arithmetic;
- Coursework or experience in Algebraic Computation, Formal Arithmetic, Formal Logic, Computational Logic, Expert Systems Design and Use, Natural Language Specifications, and Transformation of Natural Language Specs into Executable Code;
- Employment-related experience in designing and programming software systems functions such as concurrency controllers and version managers.

Salary: $3,750/mo., 40 hrs. per week. Job site: Palo Alto, CA. Please forward resume to: Job No. MLU 4322, P.O. Box 9560, Sacramento, CA 95823-0560, not later than July 5th, 1988.

Systems Programmer

The Cleveland Clinic Foundation, internationally recognized as a leader in quality patient care, education and research, is currently seeking a Systems Programmer in its Information Services Division.

The successful candidate will have extensive experience in systems programming concepts and design, knowledge of operating system software and associated utilities. Also knowledge of communications concepts, protocols and techniques, and basic electronic principles used in data processing. Knowledge of IBM-MVS/XA, CICS, TSO/PDF, DFHSM, COBOL and ASSEMBLER languages is required.

Qualified candidates should submit a resume to **Beth Paolella, Staffing Manager - Staffing Department, The Cleveland Clinic Foundation, One Clinic Center, 9500 Euclid Avenue, Cleveland, Ohio 44195.**

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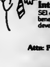

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Software Engineers

ComputerPeople Consulting Services is expanding its professional staff in our Columbus, Ohio office. We have immediate needs for experienced specialists in software development, telephony, and real-time.

We require a BS degree in computer science or electrical engineering and at least one year of professional experience. An MS degree is a plus, but not required. Environment is C/UNIX in a state-of-the-art system. Applicable skills include:

- Real-time experience
- C and UNIX with SAL
- Networking software
- C+ +/VMS
- Device driver experience
- Kernel programming
- Experience in entire software project life cycle
- Factory automation
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For immediate consideration please send your resume with information as to GPA, Visa status and/or citizenship to Mr. Jeff Miller, ComputerPeople Consulting Services, 50 Northwoods Blvd., Worthington, Ohio 43085. An equal opportunity employer.

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Tony Pakeda or
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PROGRAMMER ANALYST DATA PROCESSING

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SCI runs state-of-the-art financial/manufacturing systems. Located at the Corporate Headquarters in Huntsville, Alabama, the positions described above will become part of an ever expanding highly motivated team of MIS professionals.

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Please send resume with salary history in confidence to:

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Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of eight leading computer newspapers.

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It's easy to place your recruitment ad in Computerworld!

All the information you need is right here. Just call Lisa McGrath at 800-343-6474 (in MA, 617-879-0700). Or, if you want, you can send us the form below via mail or to our FAX machine. You can reach our FAX at ext. 739 or 740 at either of the above numbers.

The following information will help you determine the size ad you'd like to run and when you'd like to run it.

CLOSING DATES: To reserve space, you need to call us by 5PM (all continental U.S. time zones), 7 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 6 days prior to the weekly issue.

AD COPY: We'll typeset your ad at no extra charge. You can give us copy via phone, U.S. mail, or FAX. To typeset an ad for you, we need clean, typewritten copy. Figure about 30 words to the column inch, not including headlines. (There are seven columns on each page.)

LOGOS AND SPECIAL ARTWORK: Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
3 columns	4-1/16"	3"
4 columns	5-9/16"	4"
5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

RATES: Your rate will depend on the size of your ad and whether you choose to run regionally or nationally. The national rate is $12.60 per line or $176.40 per column inch. The regional rate (Eastern, Midwestern or Western editions) is $8.00 per line or $112 per column inch. You can run your ad in any two regions for $10.60 per line or $148.40 per column inch. In all cases, you can earn volume discounts.

The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs $352.80 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at $88.20 per half inch. Box numbers are available and cost $25 per insertion ($50 if foreign).

Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1-4/16 inches wide) by two inches deep (like this sample). This ad would cost $352.80 in our national edition, $224.00 in the Eastern, Midwestern, or Western Edition, and $296.80 in two regions; volume discounts apply.

SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	*Two Regions (East/West East/Midwest, Midwest/West)*	*National Edition*
1 column x 2"	$ 224.00	$ 296.80	$ 352.80
2 columns x 2"	$ 448.00	$ 593.60	$ 705.60
3 columns x 3"	$1,008.00	$1,335.60	$1,587.60
4 columns x 5"	$2,240.00	$2,968.00	$3,528.00
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PAYMENT: If you're a first-time advertiser or if you haven't established an account with us, we need your payment in advance (or with your ad) or a purchase order number. Once you have established an account with us, we'll bill you for any ads you run as long as your payment record is good.

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Company: _____

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Region: ☐ East ☐ East/Midwest ☐ Midwest ☐ Midwest/West ☐ West ☐ East/West **National:** ☐

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Instructor positions are also available for UNIX systems programmers whose backgrounds include development-level communications experience, using SNA, RFS/NFS, x.25, BX25, or TCP/IP. An advanced degree in a relevant field is highly desirable.

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S/38

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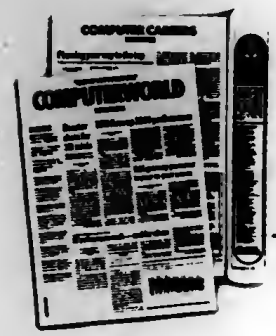

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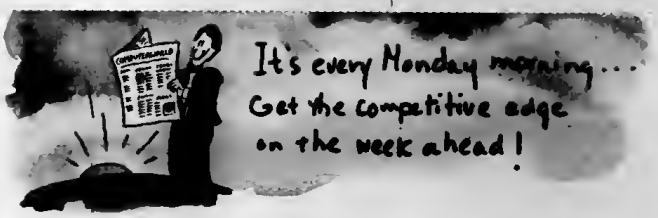

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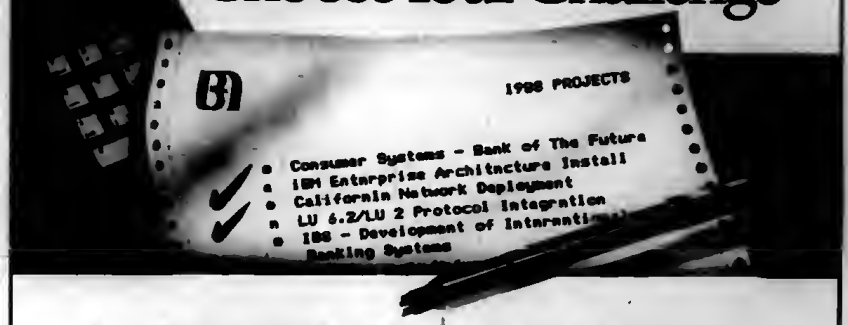

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CAREER INDEX

April 1988 computer recruitment advertising activity*

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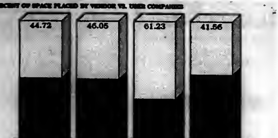

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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Shortage of 4381s continues

In February, IDC Financial Services Corp. reported there were delays in shipments of IBM 4381-21, 22, 23 and 24 upgrades. IBM claimed that demand for upgrades to the 4381-20 series was more than anticipated and that the firm would do its best to alleviate the situation.

But the shortage continues. Customers placing orders to upgrade to a 4381-20 series machine are being told they may have to wait six months.

Of course, there are customers who have already received their upgrades. But the majority of the 4381 upgrades that IBM shipped were to customers who participated in the 4381 special installation offering that the company unveiled in May 1987.

Now the problem is with customers looking to upgrade from an installed 4381 to a 20 series machine this year. Secondary market dealers claim that customers with growth plans to the 20 line must notify IBM immediately to ensure that they receive a 4381-21, 22, 23 or 24 by the end of the year.

The following is a comparison of the cost of a 4381-P23 purchased from IBM with a machine purchased on the secondary market.

The list price of a new 4381-P23 from IBM is $530,000. The cost of a P13 on the used market is $192,000. The cost to upgrade from a P13 to a P23 is $140,000. An estimated cost for an upgraded P23 is $332,000.

Thus the difference between purchasing a 4381-P23 from IBM and obtaining a used P13 and upgrading to a P23 is $198,000 — a large discount for a machine that just started shipping in the first quarter.

This may be the real reason for the delay in upgrade deliveries. IBM does not want to see its year-old machines trading for approximately 60% of list price while they are still in the early stages of production.

The secondary market for the older 4381 models is still active. However, values continue to fall for the 4381 Models 1, 2 and 3, primarily because:

- The only upgrade route available is to the 20 series, which is very expensive.
- The Models 1, 2 and 3 have been effectively replaced by both the 10 and 20 series.

Prices for the 4381-1 have dropped 59% since February, and 4381-2 prices have dropped 39%. This trend will continue as these models near the end of their economic life.

Current fair market values for the 4381 Models 12, 13 and 14 have stabilized recently. These machines offer a more attractive upgrade route to the 4381-20 series and are trading at very attractive prices on the secondary market.

Because of the long lead time of 20 series upgrades, 4381 users have looked for alternatives to meet their performance needs. Some 4381 users are purchasing an additional 12, 13 or 14 and running it alongside their existing 4381.

There are also a number of 4381-14 users who are swapping out their air-cooled machines to purchase low-end IBM 3090s or 3080 series machines. The jump from air- to water-cooled is an expensive one, but it offers more immediate growth potential than the 4381-24.

IBM mainframes — 4381s

Current fair market value

Date delivered	MIPS*	Limit price	Number of [illegible]
[illegible]	2.5	[illegible]	[illegible]
[illegible]	3.0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	4.5	[illegible]	[illegible]
[illegible]	6.5	[illegible]	[illegible]

* Millions of instructions per second

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The BoCoEx Index

Closing prices on the Boston Computer Exchange for the week ending June 10, 1988

IBM PC Model 086	$900	$850	$650
XT Model 086	$1,150	$1,200	$875
XT Model 089	$1,525	$1,550	$1,100
AT Model 099	$2,300	$2,425	$1,750
AT Model 239	$2,600	$2,650	$2,125
AT Model 339	$3,350	$3,700	$2,625
PS/2 Model 30 20-MHz	$1,600	$1,600	$1,450
PS/2 Model 50 20-MHz	$2,450	$2,500	$2,150
PS/2 Model 60 40-MHz	$2,650	$2,650	$2,475
[illegible]	[illegible]	[illegible]	[illegible]
Macintosh 512	$625	$700	$575
512K	$850	$825	$650
Plus	$1,075	$1,100	$810
Plus 20-MHz	$1,600	$1,650	$1,350
SE	$1,950	$2,100	$1,625
SE 20-MHz	$2,450	$2,475	$2,050
II	$4,025	$4,325	$3,500
[illegible]	[illegible]	[illegible]	[illegible]
DEC Rainbow 100	$900	$900	$775
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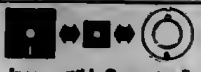

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ADDRESSES: For those who intend to submit a proposal on this project, copies of the request for proposals can be obtained without charge from: Department of Administration, Division of Finance, P.O. Box C, Juneau, AK 99811-0204, or telephone (907) 465-3246. Additional data is available for inspection at: Department of Administration, Division of Finance, State Office Building, Juneau.

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Asking the right questions can save trouble in searching for a vendor

BY NAOMI KARTEN
SPECIAL TO CW

Demand for training in the use of personal computers and fourth-generation languages is growing as end-user computing spreads and the range of products broadens.

Thus, it is not surprising that many companies are seeking the services of outside training firms to supplement in-house staffs that are stretched thin. As a result, the number of training vendors is growing.

Training vendors run the gamut from PC whiz-kids who are open for business until something better comes along to organizations with plush facilities, the latest computer and audiovisual equipment and a staff of 20 or more experienced trainers.

Selection criteria

If you are responsible for providing or facilitating training, the following criteria can help to guide your selection of training vendors:

Stability: How long has the vendor been in the training field? A start-up company may be very capable — or it may learn how to train and how to run a training company at your expense.

Expertise: Does the vendor understand your business? Can it adequately shape courses to address the unique needs of your company? Is the vendor willing to customize training material to meet those needs? What will it require from you in order to do so? These days, everyone is a computer user, so be sure the trainer is able to work with individuals from all organizational levels and all functional areas of your company.

Curriculum: For each course offered, can the vendor provide a statement of objectives, the prerequisites, an outline and a description of course material? In other words, do the courses really exist and have they been carefully thought out? Verify that courses are available for both novice and advanced students.

Instructors: How many are available? Do they work full time or are they hired on a contract basis? If contract trainers are used, make sure they are previously screened and selected and not just rounded up quickly when the vendor lands a big contract.

What are the trainers' credentials? What is their mix of educational, business and computer skills? How do they maintain expertise in their selected areas? Have they used the products or techniques for which they provide training? Determine if you have the option to use specific trainers on an ongoing basis.

Format: What percentage of the instruction is devoted to lecture, discussion and workshop? Can the mix of formats be varied to meet the needs of different groups? What is the typical ratio of students to instructor? How many students are assigned to each terminal or personal computer?

Materials: Review training materials carefully; if possible, have users also look through them. Are the materials high-quality? Are they easy to read and follow?

Are students given sufficient written material to permit post-training reviews? What does the training vendor supply in the way of training aids, guidelines, tips and techniques, cheat sheets and so on? Do students receive their own copies of all such material?

Location: Where is training provided? If it is at the vendor's workplace, can students conveniently reach it? Is the vendor willing to provide training at your company? If so, make sure you know the kinds of classroom facilities and audiovisual equipment the vendor expects you to provide, and be clear about who will supply the hardware and software.

Scheduling: Is training offered on a convenient schedule? If training is provided at your site, is the vendor willing to accommodate your scheduling needs and constraints?

Follow-up: Does the vendor provide post-training support for students? If so, what is the scope of this support? Under what conditions is it available?

Cost: What does training cost per student, per course? Is a volume discount or a discount for a long-term contract available? Are you liable for the trainer's travel expenses?

Will you incur extra charges if you need to cancel or reschedule a class? What will it cost to have training customized to your particular needs? Are any other costs involved?

To protect yourself from unexpected price increases, ensure that course fees are fixed for a specific period of time.

Assessment: What forms of measurement are provided to enable you to gauge the adequacy of the course? How does the vendor assess the effectiveness of the presented material? Course evaluations are helpful in gauging students' reaction to a course but are not a good indicator of long-term retention of instructional material.

References: What is the vendor's reputation? Does it offer references in your area? Are you satisfied with this feedback? Can you locate other references through professional associations, users groups, industry contacts or peers at neighboring companies?

Nothing speaks so well for a training vendor as a happy customer; on the other hand, excessive customer complaints or your inability to locate satisfied customers are the best clues to look elsewhere.

> TRAINING vendors run the gamut from PC whiz-kids to organizations with plush facilities, the latest computer and audiovisual equipment and a staff of 20 or more experienced trainers.

Karten is president of Karten Associates in Randolph, Mass.

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COMPUTERWORLD
Training Sections
Turn to the Training section of COMPUTERWORLD's issues for an interesting editorial feature addressing these and other questions.

7/4	Trainers in systems development
7/18	Getting the most out of software vendors
8/1	Training and management's expectations
8/15	Interactive videodisc
8/29	Cost-benefit analysis for training
9/12	On-line computer-based training
9/26	Teaching end users how to trouble-shoot problems

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"We advertised in Computerworld, Computerworld's SPOTLIGHT section and Computerworld card decks. And the results from all three were excellent."

— Mark Potenzone
Westinghouse Management
Systems Software

Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

Westinghouse has taken advantage of three advertising opportunities that *Computerworld* offers, much to Mark's — and the company's — satisfaction.

"We've done mostly image advertising in order to create awareness of this group. The name 'Westinghouse' is certainly recognizable, but not as a major software supplier, even though we've been in the software business for nearly 20 years.

"We chose Computerworld *partly because of personal experience. As a software professional, I've read it for as many years as I've been in the business, and so has everyone I've worked with. In fact, I can't imagine a computer professional NOT reading* Computerworld.

"We advertised in Computerworld, Computerworld's SPOTLIGHT *section and* Computerworld's Card Decks. *And the results from all three were excellent. We've seen what advertising in* Computerworld *can do, so there was no surprise there.* SPOTLIGHT *also delivered very pleasing results. Because it is a special pull-out section devoted to one subject, it makes sense that when we advertised in their Network Software issue, we were reaching our customers and potential customers — exclusively.*

"The Card Decks did well for us, too. Those cards are very cost efficient and we got hot responses. If someone is going to take the time to fill one out, then he or she is interested. The result is a qualified lead.

"The combination of these three vehicles gives us the best of all worlds. Computerworld *and* SPOTLIGHT *complement each other. The cards reinforce out published ads: it couldn't be better. That's why we're working on new ads for our next* Computerworld *campaign."*

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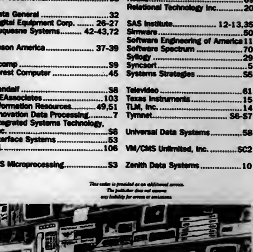

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Aug. 8	IBM Midrange Software (System 3/X)	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9
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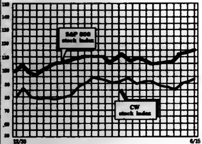

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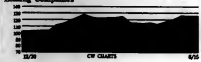

CW CHARTS

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CLOSING PRICES WEDNESDAY, JUNE 15, 1988

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	130	74	92.75	-0.9	-0.9
Q	ANDREW CORP	18	11	18.75	1.8	8.8
Q	ARTEL COMM CORP	3	1	2.38	0.3	11.8
N	AT&T	38	20	27.25	0.0	0.0
Q	AVANT GARDE COMP INC	8	2	2.16	0.1	6.3
Q	AVANTEK INC	17	8	7.00	-0.8	-8.8
N	AYDIN CORP	38	18	20.88	0.8	2.8
N	BELL ATLANTIC CORP	80	61	73.00	-0.4	-0.5
N	BELLSOUTH CORP	44	29	43.13	0.4	0.8
Q	COMPRESSION LABS INC	5	2	6.00	1.3	33.3
Q	COMPUTER NETWORK TECH	6	1	1.34	0.1	4.8
O	CONTEL CORP	40	25	33.75	0.8	1.8
Q	DATA SWITCH CORP	10	4	6.13	0.5	3.2
Q	DIGITAL COMM ASSOC	48	20	36.13	1.5	4.3
Q	DYNATECH CORP	33	14	20.50	-0.8	-1.2
Q	FIBRONICS INTERNATIONAL INC	7	2	5.50	-0.6	-8.7
Q	GANDALF TECHNOLOGIES	8	5	7.38	-0.1	-1.7
Q	GENERAL DATACOMM INDS	11	3	5.50	0.3	7.7
N	GTE CORP	45	29	38.38	0.8	1.7
Q	INFOTRON SYS CORP	14	6	12.75	-0.1	-1.0
N	ITT CORP	66	42	51.13	0.8	1.8
N	M A COM INC	18	7	10.25	0.1	1.2
Q	MCI COMMUNICATIONS CORP	15	7	15.00	0.4	2.8
Q	MICOM SYS INC	17	7	19.25	-0.8	-3.1
Q	NETWORK EQUIPMENT TECH INC	28	13	18.25	-0.8	-4.8
Q	NETWORK SYS CORP	13	7	11.13	0.5	4.7
N	NORTHERN TELECOM LTD	24	14	16.13	1.1	8.8
Q	NOVELL INC	30	12	26.38	-1.4	-5.0
N	NYNEX CORP	75	56	66.50	0.0	0.0
N	PACIFIC TELESIS GROUP	34	23	30.63	0.8	0.8
N	PARADYNE CORP	6	4	5.50	0.1	2.2
A	PENRIL CORP	8	1	4.88	-0.1	-2.5
N	PLESSEY PLC	38	23	29.13	0.1	0.4
N	SCIENTIFIC ATLANTA INC	30	8	14.50	0.8	1.8
N	SOUTHWESTERN BELL CORP	48	22	28.88	0.8	0.6
Q	3COM CORP	38	12	19.75	-1.8	-8.1
Q	UNGERMANN BASS INC	16	5	12.31	0.1	0.8
N	U S WEST INC	30	43	56.00	1.0	1.8

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	22	5	6.75	0.5	8.0
Q	ALPHA MICROSYSTEMS	6	3	6.00	0.0	0.0
Q	ALTOS COMPUTER SYS	16	8	9.25	-0.5	-5.1
A	AMDAHL CORP	56	18	54.00	3.4	6.7
Q	APOLLO COMPUTER INC	23	5	16.00	-1.0	-6.8
Q	APPLE COMPUTER INC	60	39	46.75	0.8	1.7
N	BOLT BERANEK & NEWMAN	25	13	17.00	0.3	1.5
Q	BRITTON LEE INC	4	1	2.88	0.5	21.1
N	COMPAQ COMPUTER CORP	75	34	57.38	1.5	2.7
Q	COMPUTER AUTOMATION INC	18	6	7.63	-0.6	-4.7
A	COMPUTER CONSOLES INC	10	2	8.88	0.4	4.4
Q	CONCURRENT COMP CORP	24	11	16.75	0.0	0.0
N	CONTROL DATA CORP DEL	38	18	27.25	0.0	0.0
Q	CONVERGENT TECH	8	3	3.06	-0.3	-8.2
Q	CONVEX COMPUTER CORP	18	8	8.88	-0.6	-2.7
N	CRAY RESH INC	118	47	66.63	1.3	1.9
Q	DAISY SYS CORP	12	5	10.63	-0.6	-6.8
N	DATA GEN CORP	37	16	21.88	-0.3	-1.1
N	DATAPOINT CORP	8	3	5.50	0.0	0.0
N	DIGITAL EQUIP CORP	200	89	112.88	0.8	0.8
N	FLOATING POINT SYS INC	12	3	6.00	-0.1	-4.0
N	GOULD INC	34	8	15.50	0.8	2.8
N	HARRIS CORP	41	22	29.75	0.1	0.4
N	HEWLETT PACKARD CO	74	36	53.38	-0.8	-8.0
N	HONEYWELL INC	81	49	75.88	2.4	3.2
N	IBM	175	102	118.88	2.3	1.8
Q	INFORMATION INTL INC	18	6	13.75	0.8	7.8
Q	IPL SYS INC	3	1	2.13	0.3	13.3
Q	MASS COMPUTER CORP	14	4	4.25	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	236	103	207.50	4.3	2.1
Q	MEGADATA CORP	6	3	2.88	-0.3	-8.0
Q	MENTOR GRAPHICS CORP	39	14	34.00	0.8	0.7
N	NBI INC	14	4	4.38	0.1	2.9
N	NCR CORP	87	30	69.63	6.0	9.4
N	PRIME COMPUTER INC	31	13	16.50	-0.8	-4.3
Q	PYRAMID TECHNOLOGY	14	6	13.75	0.8	6.5
Q	STRATUS COMPUTER	40	16	28.50	-2.3	-7.8
Q	SUN MICROSYSTEMS INC	45	14	28.13	-2.1	-6.8
Q	SYMBOLICS INC	6	1	1.25	-0.1	-4.8
Q	SEQUENT COMPUTER SYS INC	22	8	19.25	-0.1	-0.7
N	TANDEM COMPUTERS INC	37	16	20.00	1.8	6.7
N	TANDY CORP	57	28	47.38	0.0	0.0
N	ULTIMATE CORP	37	13	13.13	0.1	1.0
N	UNISYS CORP	49	24	37.00	0.9	2.4
A	WANG LABS INC	16	10	10.75	-0.8	-6.8

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	8	1	1.13	0.0	0.0
N	AGS COMPUTERS INC	30	11	27.50	1.8	6.8
Q	AMERICAN MGMT SYS INC	20	9	15.50	-0.1	-0.8
Q	AMERICAN SOFTWARE INC	18	6	15.00	-0.3	-1.8
N	ANACOMP INC	11	4	10.50	-0.3	-2.3
Q	ANALYSTS INTL CORP	15	4	6.00	0.5	3.2
Q	ASHTON-TATE CORP.	23	13	24.25	-3.3	-11.8
Q	ASK COMPUTER SYS INC	15	8	14.25	0.8	4.8
Q	AUTODESK INC	24	12	28.75	-2.0	-6.6
N	AUTO DATA PROCESSING	58	16	40.50	-0.8	-1.8
Q	BOOLE & BABBAGE INC	12	5	6.13	-0.1	-1.4
N	COMPUTER ASSOC INTL INC	37	15	29.75	0.8	2.1
Q	COMPUTER HORIZONS CORP	15	7	11.13	0.1	1.1
N	COMPUTER SCIENCES CORP	73	38	42.75	0.0	0.0
N	COMPUTER TASK GROUP INC	15	5	12.50	1.8	10.8
Q	COGNOS INC	17	4	6.25	-0.1	-2.0
Q	COMSHARE INC	27	12	19.25	1.8	6.0
N	CULLINET SOFTWARE INC	14	4	8.50	-0.1	-1.4
Q	DUQUESNE SYS INC	28	10	19.63	-0.4	-1.8
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	61	30	38.50	-2.3	-6.5
Q	HOGAN SYS INC	15	4	4.25	-0.8	-8.8
Q	INFORMIX CORP	31	12	22.75	2.8	11.8
Q	INTELLICORP INC	10	2	3.38	0.8	17.4
Q	KEANE INC	18	8	11.25	0.8	7.1
Q	LOTUS DEV CORP	40	18	22.00	-1.8	-8.4
Q	MANAGEMENT SCI AMER	14	6	8.00	-0.8	-3.0
Q	MICRO PRO INTL CORP	7	3	2.88	-0.2	-6.5
Q	MICROSOFT CORP	75	37	64.00	2.0	3.2
Q	MORINO ASSOCIATES INC	21	7	16	-0.8	-4.4
Q	NATIONAL DATA CORP	34	20	23.50	-0.8	-2.6
Q	ON LINE SOFTWARE INTL INC	22	6	6.88	0.0	0.0
Q	ORACLE SYS CORP	30	8	16.75	0.4	2.0
N	PANSOPHIC SYS INC	30	11	15.13	0.4	2.9
Q	POLICY MGMT SYS CORP	30	15	24.75	0.0	0.0
Q	PROGRAMMING & SYS INC	14	7	11.75	0.8	2.2
Q	REYNOLDS & REYNOLDS CO	38	14	18.25	0.5	2.8
Q	SEI CORP	15	10	18.88	0.4	2.0
Q	SHARED MED SYS CORP	30	18	21.75	-0.6	-2.8
Q	SAGE SOFTWARE INC.	10	5	5.88	0.0	0.0
Q	SOFTWARE PUBG CORP	31	8	31.00	1.8	6.1
A	STERLING SOFTWARE INC	13	6	6.63	-0.8	-8.4
Q	SUNGARD DATA SYS INC	20	15	18.50	1.3	7.2
Q	SYSTEMATICS INC	30	18	31.75	-0.3	-0.8
N	SYS. SOFT INC	24	7	18	2.8	15.4
Q	VM SOFTWARE INC	27	7	16.75	1.0	7.8

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	29	8	16.00	-0.6	-2.3
N	ANALOG DEVICES INC	24	6	15.75	-0.1	-0.8
Q	ANALOGIC CORP	13	6	7.38	1.0	16.7
Q	INTEL CORP	42	18	28.15	1.0	2.8
Q	LSI LOGIC CORP	18	7	10.00	-0.1	-1.0
N	MOTOROLA INC	74	35	51.50	0.1	0.8
N	NATL SEMICONDUCTOR	22	10	14.50	-0.8	-1.7
N	TEXAS INSTRS INC	30	39	46.75	0.5	1.0
A	WESTERN DIGITAL CORP	30	11	15.63	-0.4	-2.3

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	13	2	2.50	-0.5	-16.7
N	AM INTL INC	8	3	5.75	0.0	0.0
Q	AST RESH INC	21	6	15.50	-0.1	-0.8
Q	AUTO TROL TECH CORP	7	3	4.63	0.0	0.0
Q	BANCTEC INC	14	5	8.00	0.0	0.0
Q	CIPHER DATA PRODS INC	12	4	9.25	0.5	5.6
A	COGNITRONICS CORP	8	2	3.13	0.4	16.3
N	COMPUGRAPHIC CORP	38	18	20.88	0.0	0.0
A	DATAPRODUCTS CORP	24	7	9.88	0.4	3.9
A	DATARAM CORP	8	6	5.75	0.1	1.8
N	EASTMAN KODAK CO	71	38	46.00	0.1	0.8
Q	E M C CORP MASS	29	6	7.88	0.4	6.0
Q	EMULEX CORP	8	4	6.75	-0.6	-8.6
Q	EVANS & SUTHERLAND	36	17	17.00	-0.8	-4.2
Q	ICOT CORP	8	3	6.00	0.0	0.0
Q	INTERLEAF INC	24	11	12.75	-3.9	-23.3
Q	IOMEGA CORP	4	1	3.94	0.1	3.3
Q	LEE DATA CORP	8	3	5.50	-0.1	-6.8
Q	MASSTOR SYS CORP	6	1	2.44	-0.1	-4.9
Q	MAXTOR CORP	22	6	11.13	-0.9	-7.8
Q	MICROPOLIS CORP	40	13	17.75	-6.6	-27.8
Q	MINISCRIBE CORP	17	5	11.00	-0.8	-6.6
N	MINNESOTA MNG & MFG CO	84	45	64.50	0.5	0.8
A	MSI DATA CORP	18	8	16.13	1.8	12.0
Q	PERSONAL COMPUTER PRODUCTS INC	7	4	8.88	0.1	1.1
Q	PRIAM CORP	8	1	1.75	-0.8	-12.5
Q	PRINTRONIX INC	13	7	10.25	0.1	1.2
N	QMS INC	37	8	9.75	-0.5	-4.9
Q	QUANTUM CORP	22	8	11.00	0.0	0.5
Q	RAMTEX CORP	8	1	1.13	-0.2	-14.3
N	RECOGNITION EQUIP INC	22	6	7.13	0.5	7.5
Q	REXON INC	11	4	8.88	2.4	52.8
Q	SCAN TRON CORP	17	7	18.50	0.8	4.2
Q	SEAGATE TECHNOLOGY	40	10	17.50	-0.8	-4.1
N	STORAGE TECH CORP	6	1	1.63	-0.1	-7.1
Q	TANDON CORP	6	1	2.25	-0.1	-3.3
A	TEC INC	7	3	4.50	0.3	6.8
N	TEKTRONIX INC	41	61	29.75	0.1	0.5
Q	TELEVIDEO SYS INC	3	1	1.16	-0.1	-9.5
N	TELEX CORP	77	30	49.25	0.5	1.0
Q	WYSE TECH	40	11	18.88	-0.1	-0.6
N	XEROX CORP	80	60	55.38	1.8	3.0
Q	XIDEX CORP	18	6	5.50	0.0	0.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	CAPITAL ASSOCIATES INTERNATIONAL INC	8	3	4.88	0.0	0.0
N	COMDISCO INC /	11	4	9.88	0.0	-0.1
N	CONTINENTAL INFO SYS	37	12	23.38	0.8	2.9
Q	PHOENIX AMERIN INC	13	6	5.50	-0.8	-3.7
Q	SELECTERM INC	8	2	2.94	-0.1	-3.1

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Ups 'n downs

Stocks take a cool dip after last week's heat

The Dow Jones Industrial Average went down last week nearly as fast as it went up, and computer issues took the bruises. After hitting two consecutive postcrash highs midweek, the Dow tailed off, as the specter of Friday's "triple witching hour" — the simultaneous expiration of stock-index futures, index options and options on individual stocks — unnerved some late-week investors.

Hewlett-Packard Co. became the victim of reduced estimates after analysts left the firm's investor meeting with a bad taste in their mouths (see story page 75); HP stock plunged 4⅛ points from a week earlier to finish at Thursday's close at 52⅞. Other sinkers included Ashton-Tate Corp., down 3⅜ points to 23½; On-Line Software International, Inc., which fell 2½ points to 6⅞ after indicating an expected $6 million quarterly loss; Stratus Computer, Inc., off 2½ points to 28¼; and Digital Equipment Corp., which gained early in the week on the heels of its decision to raise prices to offset rising memory-chip costs but ended down a half point to 110⅞. Winners included NCR Corp., up 4⅜ points to 69¾ as takeover rumors persisted, and IBM, up 1⅛ points to 117⅛.

JAMES DALY

MIS programs marketing game

BY KATHY CHIN LEONG
CW STAFF

At one time, shoppers got free chicken at the local Lucky Stores, Inc. supermarket if they paid for groceries using the new EZ Checkout automated teller machine network.

At Avis, Inc., the one millionth customer returning his car via the Rapid Return computer kiosk won a new automobile.

Free poultry will not double market share, but the rash of corporate advertising and clever giveaways underscores corporate America's enterprising efforts to sharpen the MIS competitive blade.

Banking on the frustrations of an impatient public spoiled by instant food and instant pictures, big business is touting its computer services to consumers who want something and want it now. The techniques seem to be working.

Variety of media

MIS promotions have included running print and television campaigns, issuing press releases, giving away free disks and mailing brochures en masse to consumers.

Few companies have tried using television, the most expensive advertising medium. But for the last two years, Deerfield, Ill.-based Walgreen Co., a 1,400-site drugstore chain, has been running commercials on small stations around the country.

The campaign centers on the nationwide on-line Walgreen Intercom IBM Systems Network Architecture network, which tracks customer prescriptions. If customers are on vacation, they can get a prescription refill at a local Walgreen. And if the customers need a printout of how much they have spent on medication for insurance purposes, they can obtain one from the druggist's IBM Personal System/2 Model 30.

The theme of the advertisements is uniform. Consumers can save time and money using Company X's computer network. The focus is on the result, not the technology.

According to one advertising account executive, "You've got to make the message relevant to the customer."

People who travel can relate to the anxiety of dropping off a rental car in time to catch a flight. That is why Avis, based in Garden City, N.Y., has been running nationwide print ads for Roving Rapid Return.

This service lets the customer drop off the car in the rental lot and flee to the airport runway. Dutiful attendants wait nearby with a custom hand-held computer to log the time the car is returned, the name of the driver and the total amount of the bill.

A recent ad reads: "With Avis' Roving Rapid Return, it's as easy as 1, 2, 3. With Hertz, it's as easy as 1, 2, 3, 4, 5, 6 . . . ."

"We are using technology to our advantage, and we want people to know," said Robert Cardillo, vice-president of marketing at Avis.

Reaping the benefits

Meanwhile, what does MIS think of all the hullabaloo? MIS managers are basking in the limelight. All the attention given to the services their shops produce creates drive and boosts morale.

"I get a lot of pride knowing that the general public sees what we do here," said Peter Tittler, vice-president of data communications at Avis.

Gary Pradarelli, Walgreen's vice-president of information systems, agreed. "Every time I see a commercial, I know that the public has great expectations of us. That gives us tremendous drive to do a good job."

LAN gateways

FROM PAGE 1

Access priorities

LAN-to-mainframe software is rapidly gaining stature as an alternative to individual PC add-in boards

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

work Strategies, Inc. in Fairfax, Va.

These hurdles have humbled enthusiastic market estimates for SNA gateway sales. Kenn T. Dahl, vice-president of strategic planning at ICOT Corp. in San Jose, Calif., a supplier of SNA links, compared those figures with the endless predictions of "The Year of the LAN."

Dahl said analysts predicted that 30,000 SNA connectivity products would be sold last year but said that 1987 sales reached only 25% of that figure; he forecast sales of 19,000 remote and coaxial board connections by the end of this year.

"Sales were substantially below [vendors'] expectations," he said, adding that many researchers have since revised their figures.

"It's true that the numbers have been off," said Leslie Lord, a senior analyst for IBM 3270 connectivity at International Data Corp. (IDC) in Framingham, Mass., particularly for LAN-to-host gateways.

That approach accounts for a mere 11% of the current terminal emulation market, with the remaining 89% entrenched in PC-to-mainframe links, according to IDC. "Corporate America just hasn't accepted that LAN-to-mainframe links are the way to go," Lord said, citing technical problems. But many suppliers are beginning to offer diagnostic tools that should help overcome system management and other troubleshooting problems, she added.

The simplest and, historically, most popular approach to SNA host access is terminal emulation via add-in boards and coaxial connection. It is simple and clean. "It's easier and less expensive for file transfer," said Edward Hodgson, manager of computers and communications at Westinghouse Elevator Co. Some Westinghouse users who tried using a shared device for host access soon tired of waiting their turn, preferring to use private host links.

On the rise

Nonetheless, the up-and-coming technology, according to analysts, is LAN-to-host, which offers an intelligent connection and the ability to link numerous users via one gateway to the host. It can also cut costs by eliminating the need to run cable between individual workstations and the host.

In his firm's case, "it doesn't make sense to take 400 PCs hooked into a network and do double cabling" for direct host connect, said Rick Hopfer, a vice-president at Shearson Lehman Commercial Paper in New York.

Other Fortune 1,000 companies are beginning to test LAN-to-mainframe gateways via pilots, IDC's Lord said. One such example is Travelers Insurance Co. in Hartford, Conn. It is one of the largest customers of Digital Communications Associates, Inc.'s Irma card.

However, in an interview earlier this year, Travelers executives said they planned to stop buying Irma as of this month. By the end of the year, they predicted, they will have switched 300 Irma users over to the firm's IBM Token-Ring network, which is tied into its SNA host environment.

But the axiom that LANs are best suited to peripheral sharing dies hard. "Users are just not ready to deal" with LAN-to-mainframe gateways, Hodgson said. "The problem lies both in controlling the LAN and getting people to accept LANs." Also at issue is the additional strain imposed when MIS tries to track down problems arising from such a connection.

"LAN-to-host is the architect of the future; it's wonderful," said Roy Davis, manager of systems operations labor with communications data processing at Hughes Aircraft Co. in Long Beach, Calif. "But before that can happen, people need to start trusting LANs. They get used to having control over their PC and their Irma card, and they don't want to give it up." Once users reach critical mass with LAN participation, it becomes economical to use LANs for host access, he added.

A little of both

Meanwhile, Hughes, like most other users, relies on a mixed approach. First National Bank of Chicago uses Irma cards, Token-Ring connections via a 3174 and SNA gateways off of Tandem Computers, Inc. systems.

Hughes' enormous installation encompasses 400 Digital Equipment Corp. VAXs, about 100 Hewlett-Packard Co. computers and about a dozen SNA host computers utilizing a multitude of approaches to tie DEC into SNA hosts and vice versa. There are 40 to 60 LANs, most of which are connected to the SNA hosts.

Other LAN-related obstacles include applications and the new IBM Personal System/2 architectures. "People have a tendency to presume that their host and PC applications will function together," Network Strategies' Caroselli said. "People are rolling their own LANs, and unless you are very careful, you won't get the functionality that you are looking for." The PS/2s, he added, will force users through yet another learning curve.

The next two years are seen as a watershed for links into the SNA environment. IBM's Distributed Data Management, VTAM Release 2.0 and LU6.2, or Advanced Program-to-Program Communications, are expected to ease file transfer and information exchange across the different computing tiers. But that will not happen until programmers change their mind-set — which, observers agreed, will not be easy.

"We're really talking about changing the perspective of applications development of the host. We're not used to an intelligent process coming in and creating a complex collection of activity to manage," Caroselli said.

There are few if any applications written for program-to-program communications, and beyond LU6.2, there are few standards to guide that process. And LU6.2 consumes too much of a PC's overhead, but that will change with IBM's OS/2.

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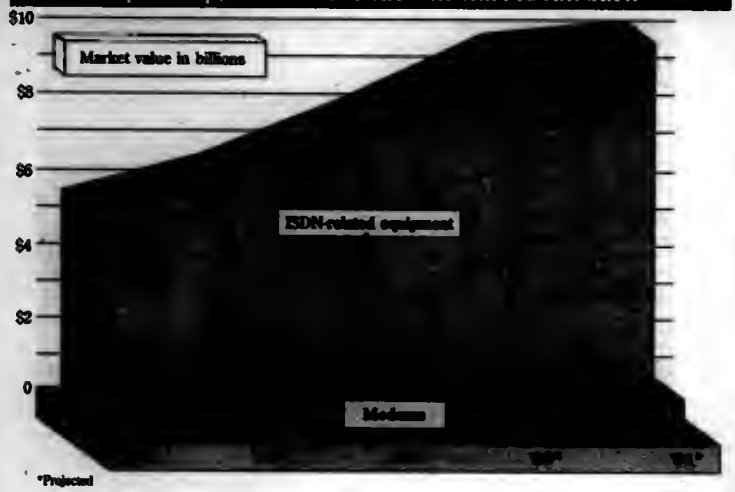
TRENDS

Modems

As ISDN picks up, modem revenue will start to fall back



The modem is often pictured as if it is on death row awaiting the arrival of its executioner, the Integrated Services Digital Network (ISDN). But while the advent of ISDN may eventually take a bite out of modem sales, the old modem still has a lot of life left in it, according to a report recently issued by the Frost & Sullivan, Inc. research house.

Modems translate a computer's digital signals into analog so computers can communicate over analog telephone lines. Since the ISDN plan would transform the U.S. telephone system from analog to digital, it seemed like modems could go the way of the 5-cent cigar.

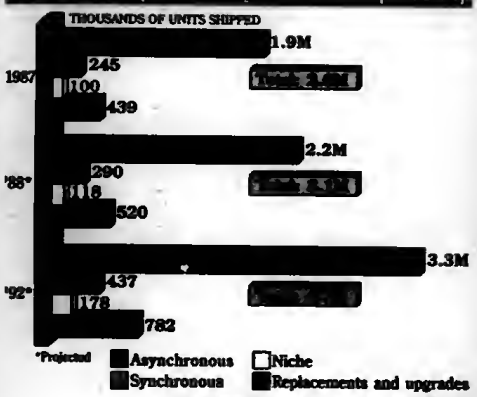
Not so, according to the study. Unit sales of modems are forecast to grow from approximately 2.6 million units sold in 1987 to nearly 4.7 million units shipped in 1992, the report said. But, this increase in shipments will not be enough to offset the price cuts ISDN will necessitate. The dollar value of modems sold last year hit $1.1 billion and is expected to peak next year at $1.3 billion. But the dollars will get scarcer, and sales will decrease to $937 million in 1992.

While the mid-1990s may eventually fulfill the prophecies of modem doomsayers, full conversion of analog phone lines into all-digital networks may never happen, leaving modem makers with a thin slice of the communications pie.

JAMES DALY

All modem types will feel price cuts

Robust shipments try to counter price dip



INFORMATION PROVIDED BY FROST AND SULLIVAN, INC.
CW CHARTS

INSIDE LINES

Queuing up? The multiuser version of OS/2 that IBM has long talked about is in the alpha-test stage at IBM, sources reported last week. IBM appears to be shooting for a second-quarter release for the product, which should make OS/2 Extended Edition Data Base Manager more than just a personal computer product.

You won't read about Compaq laptops here . . . but you will hear about the mobile plans of AST Research. The Irvine, Calif.-based firm has significantly branched out, changing from an add-in board company to a systems vendor and will go one step further later this year with the introduction of a portable. The system is said to be a (formerly) top-secret project that will feature a black-and-white LCD screen and a high-speed Intel 80386 processor. Look for a product introduction in the fourth quarter.

Take a picture. Advanced Graphic Applications in New York will demonstrate Wednesday what it claims is the first microcomputer-based erasable optical disk subsystem. At PC Expo this week, the company will show its universal Microsoft MS-DOS driver software — which can also be used with write-once read-many, compact disk/read-only memory and magnetic storage devices — storing, retrieving and deleting application data on erasable optical disks created with Lotus's 1-2-3 and Wordperfect's Wordperfect. The demonstration will use erasable optical media made by 3M. Fall availability of the subsystem is expected.

Opening up. IBM is getting specific about how it will deliver on its promise to make Open Systems Interconnect (OSI) part of the Systems Application Architecture. The vendor's Common Programming Interface for Communications (CPI/C), a set of commands that is supposed to make it easier for developers to write applications to IBM's LU6.2 peer-to-peer protocol, will also support the OSI transaction protocol, IBM spokesman James Cypher told us recently. That means applications written for CPI/C wil be portable not only across IBM systems supporting LU6.2 but also non-IBM systems supporting the OSI protocol. Delivery date — unspecified.

Trailing edge. Word has it that DEC is set for a major Transmission Control Protocol/Internet Protocol (TCP/IP) announcement. No word on what it is, but DEC systems supported NBS's electronic mail gateway between X.400 and TCP/IP E-mail protocol Simple Mail Transfer Protocol at the Enterprise Networking Event. The company is clearly bowing to pressure to support TCP/IP. On another front, next week DEC will announce a new product for PC communications into IBM environments.

But will they also take my PCjr? At PC Expo tomorrow, IBM is expected to announce a trade-in plan under which users can give back IBM PC XTs and ATs in return for discounts on its PS/2s. No word yet on the extent of the discounts or what will happen with the old machines. Also on Tuesday, Symantec is expected to be joined by IBM for the introduction of an OS/2 version of Q&A, a popular flat file manager and word processor.

Back to school. Wang Laboratories is taking extreme measures to win a microcomputer contract at one of its most loyal customers, Johnson and Wales College in Providence, R.I. Wang, which recently broke out a separate microsystems division in an effort to boost PC market penetration (CW, May 23), reportedly has offered to donate some 50 IBM PC-compatible machines to the college to secure a recent contract proposal. Wang watchers, however, are wondering how the company can justify giving away PCs when it has yet to discover a way to build them at a cost low enough to ensure respectable profit margins.

Silly season on Wall Street. While NCR stock continues to climb, one financier last week said the real Unisys target is CDC and another voice rechoed on Cullinet. And maybe Unisys Chief Mike Blumenthal has a bridge for sale in Brooklyn to pay for it all. If you know better, call the hotline at 800-343-6474 or 617-879-0700 and put news editor Pete Bartolik on the right track.

Our connections with IBM have everyone talking.

As the saying goes, the more well-connected you are, the more powerful you are. One example of this is what we've done with IBM's personal computers and the System 3X minicomputers.

At IDEA, we've developed a greater number of ways to connect IBM's full line of PCs and the PS/2 to the System 3X than anyone else. And in the process, we've truly pushed the capabilities of these machines to new limits.

Our position as the leader in PC-to-3X communications has been attained by following a simple belief – one which proposes that merely making the connection is not enough.

FROM THE PC TO THE PS/2.

Not long after IBM introduced the PC, we introduced the first fully functional link between it and the System 3X. And we did the same thing when the PS/2 came out.

Now what all this means is that no matter which IBM personal computer you have, or even if you have a variety of them, we have a variety of ways to connect them to your 3X. Plus we'll be able to connect whatever comes along in the future.

THE GATEWAY TO COMMUNICATIONS.

If you want to be well-connected, you've got to expand your network. The best way to do that is with IDEA's local and remote gateway products.

With the IDEAcomm 5251/Gateway, for example, you can distribute host sessions to any combination of PCs and PS/2s on your IBM Token Ring, or NetBIOS-compatible network, and give them access to your 3X.

On a smaller scale, IDEAcomm 5251/Share lets four microcomputers access the System 3X through just one emulation board. And a user can even call in from the field with a laptop computer to get current information from the 3X through an asynchronous modem.

LOCAL OR REMOTE CONTROL.

Further evidence of our commitment to advancing PC-to-3X communications is seen in our local and remote capabilities.

IDEAcomm 5251, which is the standard in twinaxial communications, allows single-keystroke access to the System 3X. Yet it's one of the most powerful products available today. It's the only one to support full 132 column 3180 emulation, while providing graphics output and a windowing feature that lets you view multiple concurrent host sessions. For your branch offices, the IDEAcomm 5250/Remote offers the most cost-effective means of access to your 3X.

If you want to get the most from your System 3X, call us at 1-800-257-5027. Because when it comes to 3X communications, it's true what they say – it isn't what you know, it's who you know.

IDEAssociates™
The Leader in PC Technology.

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The most important link in our business software system.

Today everyone talks about connectivity. Computers talk to each other. And business software companies talk about their latest advances in bringing it all together.

But despite their technical skill in linking PCs, mainframes and mid-range systems, most software companies fail to see the importance of connecting with you. And everyone else in your company who touches a keyboard.

The result? Inflexible business applications that cause nothing but confusion. As people struggle to learn the software, meet tight reporting deadlines, and stay out of your DP shop's way all at the same time.

At McCormack & Dodge, we made the connection with people years ago, and Millennium® was the result. Business software that allowed people to work in a truly integrated computing environment.

Now, that technology has evolved into customer-controlled software. A line of business applications you can easily tailor to your individual needs.

Consider our General Ledger package. A retailer might turn it into a weekly stock ledger, while someone in the Oil & Gas industry sets it up for project reporting. On the other hand, our PC Link software lets any user develop custom menus, and follow a work flow that best reflects their business.

It's all accomplished without the customary confusion. And it all comes from a software company consistently rated by Fortune 500 executives as a top vendor in overall service and support.

If there's a missing link in your business software system, maybe you should consider customer-controlled software. To find out more about it, or any of our Financial, Human Resource, Manufacturing, and Application Development systems, call McCormack & Dodge at 1-800-343-0325.

We put the customer in control of the software.

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